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The SHOW-HOW Magazine

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BOLT-ON EQUIPMENT What Will It Do?

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How I foxed the Navy

by Arthur Godfrey

The Navy almost scuttled me. I shudder to think of it. My crazy career could have ended right there. Who knows, I might still be bumming Chesterfields instead of selling them.

To be scuttled by the Navy you've either got to do something wrong or neglect to do something right. They've got you both ways. For my part, I neglected to finish high school.

Ordinarily, a man can get along without a high school diploma. Plenty of men have. But not in the Navy. At least not in the U. S. Navy Materiel School at Bellevue, D. C., back in 1929. In those days a bluejacket had to have a mind like Einstein's. And I didn't.

"Godfrey," said the lieutenant a few days after I'd checked in, "either you learn mathematics and learn it *fast* or out you go. I'll give you six weeks." This, I figured, was it. For a guy who had to take off his shoes to count above ten, it was an impossible assignment.

I was ready to turn in my bell-bottoms. But an ad in a magazine stopped me. Here, it said, is your chance to get special training in almost any subject—mathematics included. I hopped on it. Within a week I was enrolled with the International Correspondence Schools studying algebra, geometry and trig for all I was worth.

Came week-end liberty, I studied. Came a holiday, I studied. Came the end of the six weeks, I was top man in the class. Within six weeks I had mastered two years of high school math, thanks to the training I'd gotten.

I.C.S. made the impossible—easy!

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COVER

Don Chapman's neat '27 T-Merc is considerably more reliable than our cover would seem to indicate, but the combination of girl, sign and setting was too much for Felix Zelenka, who shot the Ektachrome. Story starts p. 34.

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BRIEF AND TO THE POINT:

230 Words from the Editor

WE'VE done something this month that may come under the heading of extending our necks. By this we mean that we've set down facts and figures regarding the performance of that form of accessory known as "bolt-on-equipment." The fact that time only permitted the use of one kind of equipment has little bearing on the case. Any brand of equipment made by any one of several reliable manufacturers would have produced comparable results varied only by slight design differences which would bring in changes of horsepower at slightly different rpm. What does matter is that bolt-on equipment produces startling results for little effort and does it inexpensively. The story starting on page 10 will give you the low-down.

Another item that flies in the face of tradition is the series by Chuck Eddy on the Fordomatic. He likes it and we know from experience that he can make it sit up and perform with the best. The first story, on page 52, tells what it is. The next will detail just how it can be used with high performance engines. Another first is the story by Don Francisco on what is apparently the first competition-tuned Buick V8 which appears on pages 24 through 27. Don explains the thinking behind the nail-sized exhaust valves which are a peculiarity of the new GM product, a point of contention among performance enthusiasts.

THINGS TO COME

FROM the letters that have been coming across our desk daily, we have deduced that there is a great deal of interest in the use of Fiberglas in automobile bodies and particularly in how it can be used by any citizen in his own garage. We've got two real goodies coming up in this department. One will detail how a mold can be taken from a metal car to produce a Fiberglas version. This one will also tell the complete story of how the original car was built, a double bonus so to speak. The other will show how you can build a plaster mockup to your own design to build as wild or as conservative a body as you wish. These features will just about cover the field and should answer most of the questions concerning the building of plastic automobiles.

Anybody can pull horsepower out of huge amounts of cubic inches, the amount varying with the skill of the builder. One of the toughest tricks is making the smaller, more inexpensive mills get out and scream. It has been done, in fact, anybody can do it and there are lots of inexpensive, small engines from MG to Ford Industrial Fours around. In the near future we'll start on these and tell you how you can do it.

"Pssst, bud, one will get you six!"

see page 51!

LETTERS

UNFINISHED

Dear Sirs:

Just found the greatest little hot rod book at our newsstand here on Post. HONK is loaded with everything anyone would want to read or see.

I have somewhat of a hot rod myself, but was unable to complete it because Uncle Sam said he needed all young men.

It's a '50 Ford, black and sea-island green, twin spots, Olds hubcaps, Crestliner trim, special grille, spare tire kit, with chrome duals coming up through the gravel pan and over the bumper. The inside has some chrome around and the mirror was switched around.

When I get out I plan on putting in a full house motor and redoing the inside.

Sincerely,
Pvt. W. T. Christopher
Texarkana, Texas

TWEEN AGE PROBLEM

Dear Sirs:

I buy HONK magazine every month because I like its size and cost. — Although I am only 15 years of age, I guess I have the car bug. When I look at your books I wish I could have a car to work on and a place to do it.

I was wondering whether or not there are any places where boys, under age to get a drivers license, can go to work on cars and submit designs that they made up?

Thank you,
Vincent DiAntonia
Oaklyn, N. J.

Can anybody help?—Ed.

OXYGEN VS. BLOWERS

Dear Sir:

My roommate and I have been arguing about superchargers. I wish you would settle the argument for us.

He would like to know why anyone hasn't tried putting pure oxygen into a carburetor under pressure. He says it could replace a supercharger.

Could you tell me what the purpose of a supercharger is, the result of using pure oxygen as a supplement to the air, and which method would be best. Also what is the purpose of water injection.

Thanking you kindly.

Sincerely,
Gilbert M. Colombo
Georgia Institute of Technology
Atlanta, Georgia

The oxygen injector has been used successfully by only one person to our knowledge. This was Barney Navarro, who ran a Class A Modified roadster using an injector of his own design. The main trouble with this system is that it raises the heat of combustion considerably to the point at which pistons melt like so much lead foil. Barney experienced considerable piston trouble in his experiments before he reached any degree of success and even then dropped a few slugs at Bonneville. A better method of introducing oxygen is through the use of some form of nitrate or other oxygen bearing compound such as pure hydrogen peroxide. Supercharging, on the other hand, increases the density of the charge rather than effecting a mere increase in oxygen. This also raises the heat of the charge but this can be controlled through varying the amount of boost and by richening the fuel mixture.

Water injection is used primarily to control the heat of combustion and to reduce tendencies toward detonation by reducing the speed of combustion, allowing the use of higher compression ratios and greater spark advance.—Ed.

OUR ERROR

Dear Sir:

In your recent November issue of HONK, you printed a very nice picture story of the Paradise Mesa Championship Drags.

In one particular case you printed a picture of a '41 Ford convert and a pick-up truck. You so kindly stated the outcome that took place, but the term "stock" was used much too loosely.

Would you mind printing a retraction as the car you called stock was the winner of the Championship trophy for the hot "D" gas class. Plus 20 trophies in the past 1½ years at the local drag strip, "Saugus."

Thanking you,
Don Conemac
Burbank, Calif.

We've given our caption writer 30 lashes, Don. Obviously the bear is strictly full-house. The c.w. mentioned above defends himself by saying that he meant "stock looking."—Ed.

DIESEL

Dear Sirs:

I have read in your magazine, CAR CRAFT, on page 66 of the December issue, under Bonneville International Records, that a Herda, Fuller, Kramer owned GMC Diesel Special turned 169.32 in one mile at Bonneville this year.

There is a picture of a similar vehicle at the bottom of the page. Is this the same particular piece of machinery that turned this speed?

This seems a rather astonishing speed for a tractor of this size if the foregoing information is true.

Would you please enlighten me on this particular issue.

Sincerely,
Gene Reaves
Buena Park, Calif.

We're sorry we misled you, Gene. The record was set in a streamliner, the shell of which formed the skin for Chet Herbert's Beast III, which ran in the 1952 Bonneville Nationals. The diesel tractor pictured with the story turned 85 mph one way. Had Fuller known it he could have returned for a record and made it official, the records being wide open in that class.—Ed.

T-MAN

Dear Sirs:

I am strictly a T Bone man and you really flipped my coil with the article on Dan Post's little jewel. More on the same line please and you will acquire another steady customer.

The article didn't do much to me as I have only picked up one slightly used T, one 16 valve head and a very round gasoline tank, and have a very good lead on a pair of bucket seats.

More of the same.

Sincerely,
Dennis R. Ivy
Oklahoma City, Okla.

CHANNELING

Dear Sirs:

Just received the December '53 issue of CAR CRAFT, and enjoy your magazine very much. I like HONK'S new name *much* better!

I wish that in your "Here's How" you would show how to build a custom car step-by-step, with little help from a custom shop.

I enjoy "Torch Tips," and how about more of "Garage Gimmicks"?

Sincerely,
Larry Mudge
Flint, Michigan

We anticipated you, Larry. By this time you will have seen the step-by-step story on channeling the '39 Merc. Hope it helps. If not, we have a series coming up that should do the job.—Ed.

SWING AXLES

Dear Sirs:

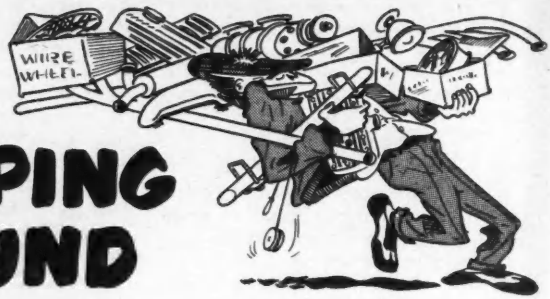
I would like to know if a swing axle, such as the one Joe Goss made in the December '53 issue of CAR CRAFT, could be used in a road race such as the Mexican Road Race.

Also, could it be used on stock car, would it (the swing axle) affect cornering?

Sincerely,
James Strausser
Tarentum, Penna.

The swing axle has been used in road racing with success, particularly by the Auto Union

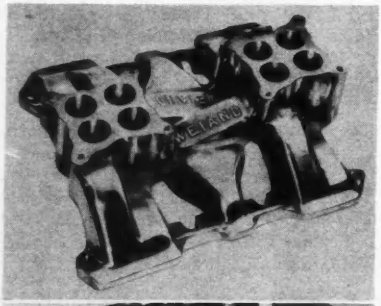
(*Continued on page 57*)

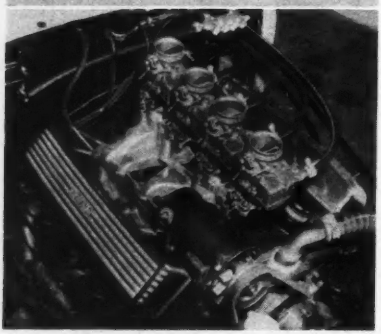


SHOPPING AROUND

2 X 4 IS EIGHT

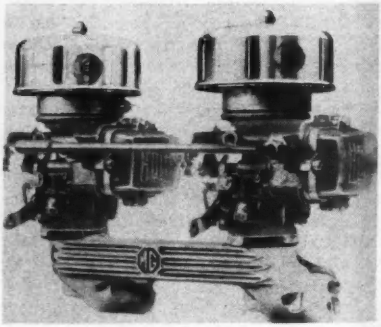
IN the past year the swing has been to the four-barrel carburetor with much good equipment coming out to adapt the big jugs to cars not equipped to take them. Now comes a manifold to double the job on at least one car which comes equipped with the four-bore carburetor. Put out by Phil Weiand, the new manifold is designed to adapt the Cadillac for two of the monster carburetors. The new manifold is dual in purpose as well as in form, too. With a special adaptor the device can be set up to take four Stromberg or Chandler-Grove Ford carburetors, a favorite layout for the competition-minded enthusiast. The manifold is available for $98 from Weiand Power and Racing Equipment Co., Dept. CC, 2733 San Fernando Rd., Los Angeles 31, Calif. Also available from dealers on a nationwide basis.





MG GOODIE

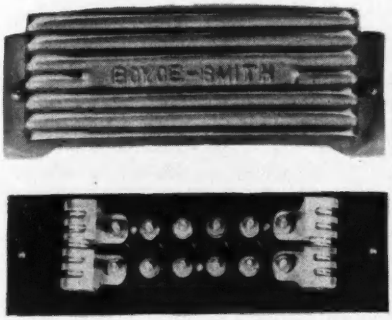
THERE are some that hold forth that the S.U. carburetors which come as standard equipment on the MG and other British cars, are the greatest thing that ever happened. There are others who are equally vehement to the effect that the lack of accelerator pumps and main dump tubes louses up any acceleration tendencies the car may have. We don't intend to arbitrate the case; both sides have



their points. For those who want the acceleration characteristics of the American carburetor, Bell Auto Parts has produced this dual goodie for the MG. The manifold, according to the manufacturer, will give up to seven more horsepower by dyno tests. The kit can be obtained complete with carbs and linkage and ready to mount for $62.50 or you can have the manifold alone with linkage for only $29.95. This and other pieces of equipment for foreign cars and all American cars from T to '54 Cadillacs and Chryslers are all listed in Bell's new catalogue available from Bell Auto Parts, 3633 East Gage Ave., Bell, Calif., Rm 401.

TERMINAL BOX

ONE of the nastiest jobs in reworking a car, particularly when building from scratch, is that of wiring. The stuff can get like so much spaghetti if one is not careful. One of the best ways to avoid this is to use a terminal box which brings all the leads to



one central location. Usually these have been homemade and have looked utilitarian at best. At worst they've looked like an amateur radio technician's nightmare. A neat remedy for this is a new terminal box with a finned aluminum cover designed by "Doc" Boyce-Smith, builder of the Victress sports car and dragster bodies. The box carries two resistors for use with a dual coil ignition system. Eight other terminals for other parts of the electrical system are completely centered in

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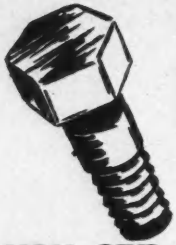

PERFORMANCE REPORT:

BOLT-ON EQUIPMENT... WHAT WILL IT DO?

you can soup for safety

by John Christy

DURING the past few years there has been considerable controversy over the value of what has become known as "bolt-on" speed equipment. Some hold that bolt-on, or external, equipment is best used only after extensive internal modifications. Others insist that the internal changes only increase the efficiency of the actual speed equipment.

The fact remains that any souping procedure can be boiled down to the essentials of increasing the ability of a given engine to utilize the "canned" energy in a given amount of fuel. How this efficiency is gained is immaterial. However, in an effort to determine an easy and economical way to add usable power to any engine, we conducted a series of tests on a stock 1940 Mercury club coupe. The main interest in this case was to determine just how much we could add to the engine without increasing the cubic inch capacity or changing the valve action in any way.

• Here's the raw material, a stock '40 Mercury engine in fair condition.

Basically the actions one can take in improving engine performance by working from the outside are: increase of compression, better distribution of the fuel/air mixture to the ports, increase of exhaust scavenging and increasing the efficiency of the spark at higher rpm and under conditions of high combustion chamber pressures.

To accomplish this we called on Al Sharp, who manufactures heads and intake manifolds for a variety of cars, including the Mercury, and Frank McGurk, who also manufactures equipment. Frank is owner of a brand new Clayton chassis dynamometer. Al had just purchased the Mercury for a general business transportation car.

The Merc was completely stock and was in neither excellent nor in poor shape, having approximately 12,000 miles on the engine, a standard rebuilt job. Without any changes whatsoever except for a standard tune-up which included a set of new H-10 plugs and a strobe job on the distributor, the car was placed on the dyno. Top horsepower delivered at the rear wheels was 69 at 50 mph. From that point it fell off rapidly to 63 bhp at 60 mph. After the dyno checks the car was taken to the Santa Ana drag strip where it turned a top speed of 65.47 mph at the end of the quarter-mile, going through for an elapsed time of 17.23.

The car was then taken back to the shop and a Sharp dual intake manifold was installed in place of the stock set-up. The carburetors used were standard Stromberg 97's with .048 jets and no reworking except for a check to see that the butterflies were properly seated.

Placed on the dyno and run through the same series of tests as before, the car showed amazing results. Peak bhp was a

• *At the start of the third test, head is readied for installation by Al Sharp.*

good solid 80 at the rear wheels at a speed of 55 mph, as opposed to 67 bhp at the same speed produced by the stock set-up. The major increase did not start to take effect until a speed of about 50 mph was reached, the dual carburetion producing only about two extra horses at lower speeds. (*See chart—Ed.*) At the drag strip again, the manifold gave the car an increase of about five-and-a-half miles an hour top speed through the traps, tripping the clock at 71.01 miles an hour with an elapsed time of 16.56 seconds for the distance.

It will readily be seen that the safety factor at cruising speed was reached at just about the speed limit set by most states. This means that at 55 miles an hour cruising speed, if one found oneself in a tight

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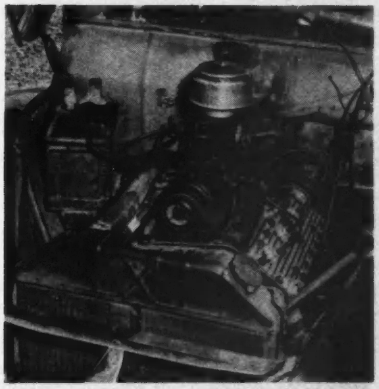


• *Time run short so heads could not be tested alone as shown in photo.*

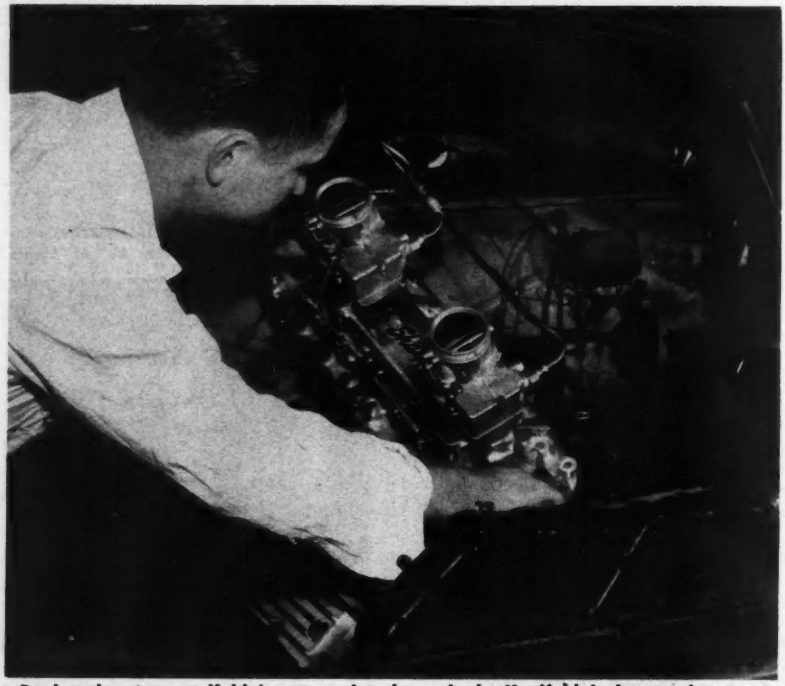
• *Sharp and Frank McGurk start series of tests on Clayton chassis dynanometer.*

(*Continued from preceding page*)

spot the reserve power took its greatest effect at the critical point, giving that extra surge to pull out.

The next change made on the car at this time was the addition of a set of 8.5 to 1 heads. The only change to the engine at this point was the replacement of all the short head studs with long type used ordinarily in the top row since the heads were of the same thickness throughout.

On the dyno the horsepower pattern changed considerably, horsepower increases being noticed at lower speeds, increasing as the speed went up. At 30 mph the increase was a mere one horse over the previous set-up. At 35 the increase was four bhp, at 40 it was eight. Peak horsepower was again reached at 55 mph with a total of 84 bhp delivered at the drive wheels. However, a glance at the chart will show that the horsepower increase was smoother over the entire



• *Dual carburetor manifold is set up for dyno check. Manifold is low, racing type.*

range. Had the heads alone been tested (time did not permit it) the greatest effect would have occurred in the 30 to 50 mph range.

Top speed through the traps at the drag strip showed an increase of slightly less than four miles an hour over the time with the manifold alone, or an increase of slightly less than 10 mph over the stock engine. Top speed was 74.99 mph with an elapsed time of 16.07 seconds, or more than a full second better than the stock layout.

The next piece, or pieces, of equipment to go on the car was a dual exhaust system using two Hollywood Deeptone steel-packed mufflers without headers which very likely would have increased the value of the system. However, in this particular case the object was to accomplish a useful but conservative increase with the fewest tools and at the least expense.

As was expected, since engine breathing changes are most noticeable in the high speed ranges, the change in horsepower did not occur until 45 mph was reached. At 45 one horsepower was added. At 50 the increase was two, with the same increase being noticed all up the line. Again, had the dual exhausts been used alone the increase would have been considerably more noticeable.

Top speed in the standing quarter with the duals was 75.01, the car tripping the clock for an elapsed time of 16 seconds flat.

Final bit of equipment to go on the car was a Harman-Collins dual coil ignition. It was not expected that this would add more horsepower but that it would add to the top speed in the quarter mile. Actually, on test, the reverse was true. An additional one horsepower was added through the speed range from 40 mph on up. Top time through the traps was exactly the same as it was before. It was regrettable, however, that the actual top speed of the car could not be tested since it was obvious to all who drove the car that the engine was not reaching anywhere near maximum rpm although peak horsepower had been passed.

It appears that the value of the reworked ignition system is better control of the spark curve resulting in peak ignition efficiency. Although no mileage tests were taken, the horsepower curves at cruising speed would seem to indicate that the engine was operating more efficiently which would result in better gas mileage. It would also appear that the top speed of the car was increased ma-

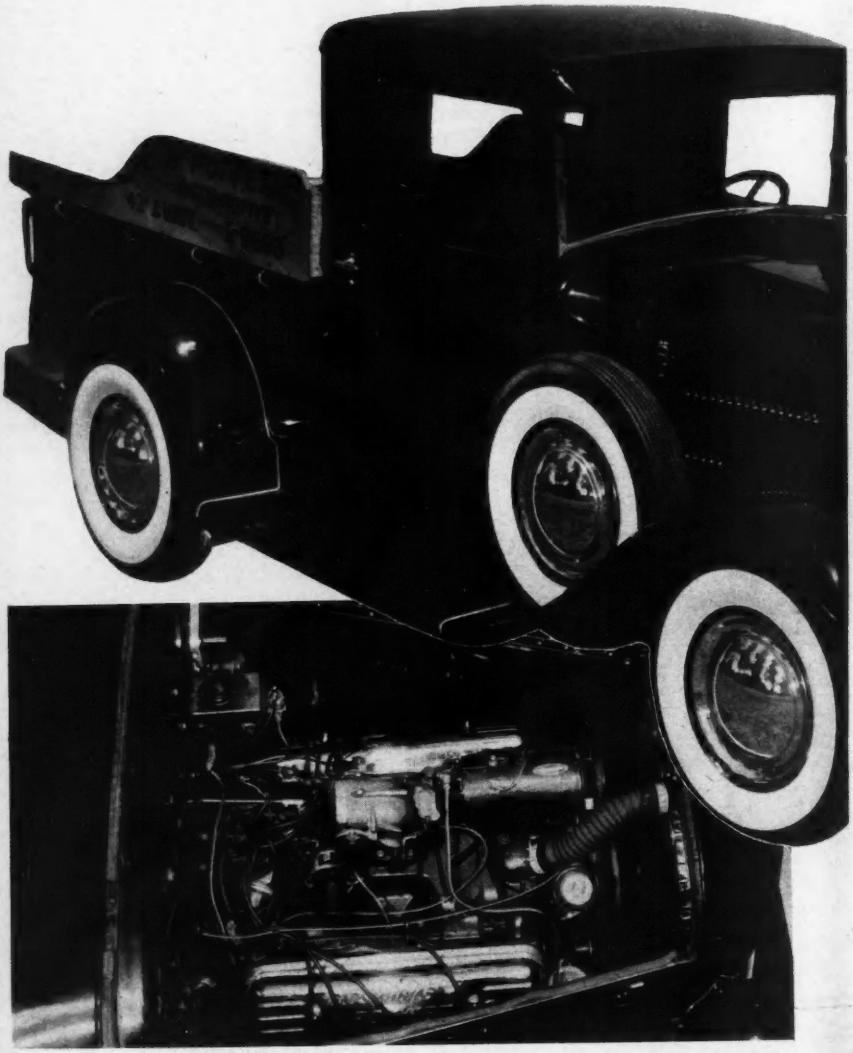
(*Continued on page 56*)

	SPEED	30	35	40	45	50	55	60
		HORSEPOWER TO REAR WHEELS						
MODIFICATIONS	STOCK	50	59	64	70	69	67	63
	MANIFOLD	53	61	66	72	73	80	76
	HEADS*	54	63	70	78	79	72	69
	HEADS & MANIFOLD	54	65	74	80	83	84	81
	DUAL EXHAUST HEADS MANIFOLD	54	65	74	81	84	86	83
	ABOVE PLUS DUAL IGNITION	54	65	75	82	85	87	84

*Projected figure

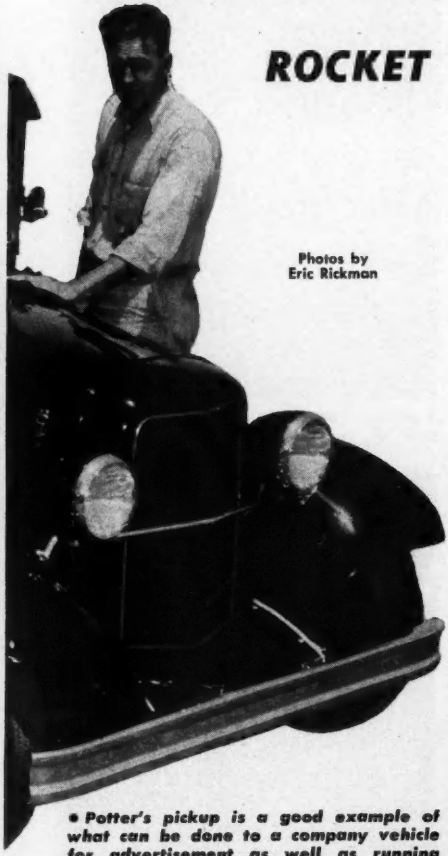
• *Chart shows figures obtained in dyno tests. Figures for heads were projected.*

border city



half-breed

ROCKET IN DISGUISE



Photos by
Eric Rickman

• Potter's pickup is a good example of what can be done to a company vehicle for advertisement as well as running parts and everyday pleasure driving.

ONCE there was a time when one of the pleasures of owning a big fat Merc with all the external goodies was watching the expressions displayed by unsuspecting service station attendants making the usual oil and water check.

That day, regrettably, has passed. The fully equipped Merc has been with us for some time and the populace is getting used to the sight of a set of finned heads and two or more jugs nestling under an innocent-looking hood.

However, innocent-looking hoods can still hold surprises for the unwary or uninitiated. A. W. Potter's jewely little black '33 Ford pickup is a case in point.

The little truck is so beautifully finished that it is obvious that considerable work has been done. One might be led to suspect that there might just be something under that hood—possibly a nice, clean Cragar mill or perhaps even a Merc. But the average

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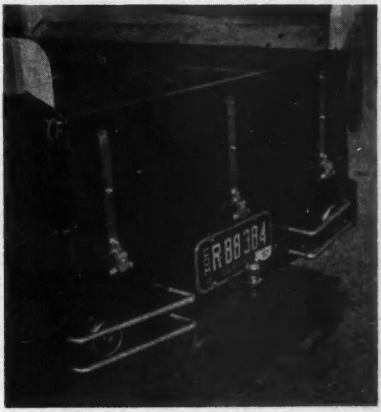
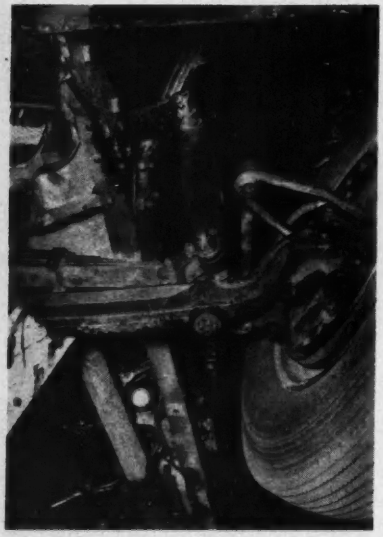


LEFT

• Secret of engine installation was modifying chassis, leaving firewall untouched.

RIGHT

• Late Pontiac taillights are installed. The nerfing bar bumpers were custom built.



• *The front shocks are mounted on special brackets. Front axle is dropped "dago."*

• *Special brackets attach Olds rear axle to Ford radius rods and springs.*

• *Rear radius rods are split and hung on padeye mount on center crossmember.*

• *Rear of the engine is braced by fabricated boxed channel iron crossmember.*

border city half-breed

continued

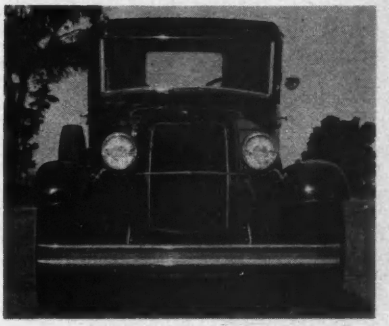
service station attendant or curious onlooker is not usually prepared to go as far in his thoughts as has Potter in actual modification. Underneath that stubby bonnet lurks one of the neatest Oldsmobile Rocket installations we've seen.

Potter admits the job wasn't the easiest he's ever done. He's done quite a few before, too. Canadian born, he moved to California in 1924 and ran modifieds at the lakes during the late '30's. The pickup was originally purchased as a parts runner for Potter's service layout in San Diego but was in a fairly shaggy condition when acquired.

Just as a spare time project, Potter began to rework the little bear. One thing led to another, modification leading to modification until the truck wound up in its present condition.

The main problem, of course, was installing the Rocket. Potter chopped out the X-member and fabricated a new crossmember from heavy channel. Actually two crossmembers were used—one to hold the rear of the Hydramatic and the other bracing the rear of the engine.

To make room for all this, Potter split the front radius rods and mounted them alongside the frame. The rear radius rods were split slightly and hung on the rearmost of the two middle crossmembers. (*See cut—Ed.*) The inside of the front crossmember was reinforced with ⅜ inch plate for extra strength to carry the weight of the Olds.



• Shortened '51 Ford pickup bumper is used. Grille is from '34 Ford truck.

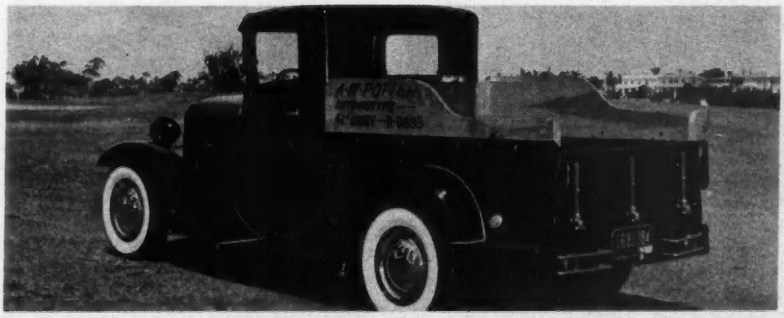
Absolutely no butchering was necessary on the firewall.

An Olds rear end and axle was also used. This was modified to take the usual Ford cross-spring suspension by means of two heavy flame-cut brackets to which were attached the rear radius rods, spring hangers and shock links.

With the front end lowered through the use of a dropped axle, the rear end had to come down to put the truck on a level plane. This was done, not by long hangers, but by flattening out the rear crossmember.

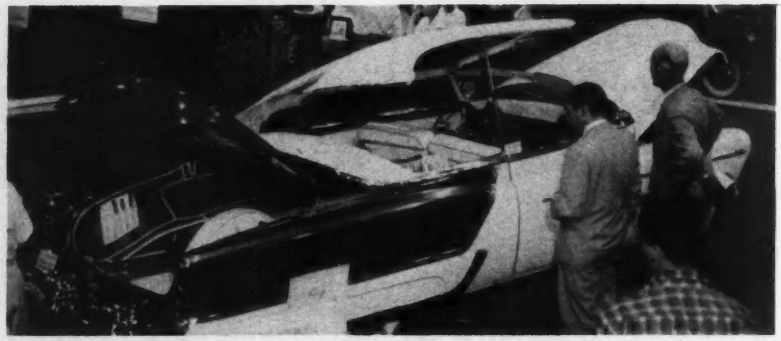
The result of all this is a surprisingly rigid chassis, which with the smooth, powerful push of the Olds-Hydramatic combination, produces surprising performance.

Next time you lift a hood, be prepared for anything. That innocent-looking machine just might be a Rocket in disguise.



• Potter's little jewel has just the right amount of chrome goodies distributed for flash. Exhaust is routed out just forward of the rear tires. Tips are barely visible.

MOTORAMA: BIG, BIGGER,



• *Gaylord's Olds convert was completely unbuttoned to the admiring crowd of spectators.*

• *Hudson's brand new limited production "Italia" club coupe occupied central place of honor in show.*

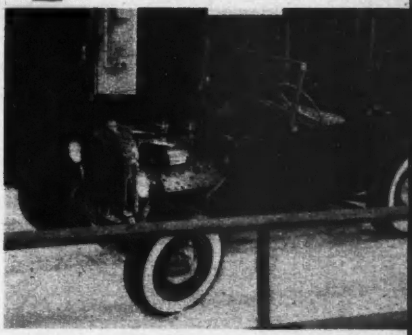
BIGGEST ... and still growing!

Photos by Rickman, Medley, and D'Olivo

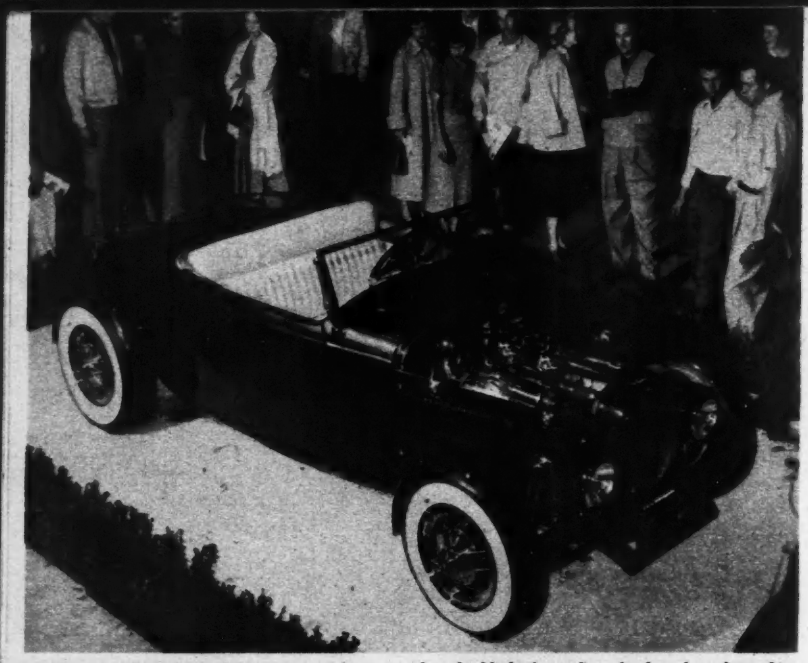
IF anyone remained convinced that the spectacular automobiles died with the silent screen, all that person had to do was to wander into Los Angeles' huge Pan Pacific Auditorium and spend the next few hours (it would take that long) looking at the equipment therein.

This was Motorama, without doubt the country's most spectacular annual exhibit of unique and marvelous methods of getting from here to there. No one type of vehicle could be said to dominate the show. Every method of powered surface transportation from cars for the smallest of small fry to

(Continued on Page 21)



• *Bob-tail roadster belonging to Bill Vogt was shortest full-size car in extravaganza.*



• *Thompson bros. beautiful maroon roadster was show highlight for tedious backyard workmanship.*

• *Speed boat display included world record holders in both hydro and inboard classes.*

• *Chuck Porter, Belmont Sanchez Bonneville coupe wore a new black and white paint job.*

• *Chuck Baker's Henry J-Caddie was a show stopper. Its quarter-mile record is 107 mph.*

• *Bill Burke's 167 mph Fiberglas coupe holds SCTA Bonneville record for closed sports cars.*

MOTORAMA continued

seagoing hot rods, from the latest in Detroit limited production to the hottest Bonneville machines was represented. Few, if any, of the cars and boats had ever been placed on public view except during competition in the case of the Bonneville cars and racing boats.

One of the most interesting bits in the show was the heavy sprinkling of Fiberglas creations. These cars came in all shapes, sizes and for any purpose from tooling around town to flat-out competition. Fiberglas is such that it can be used in backyard con-

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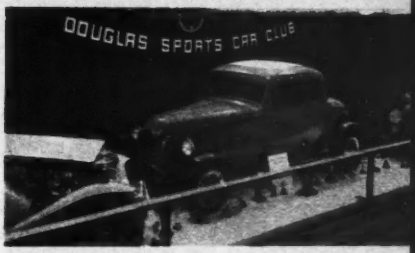
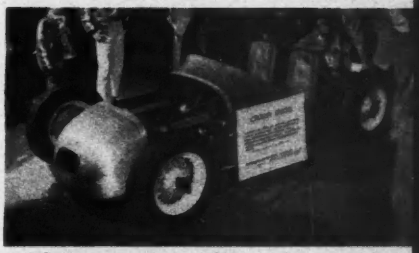


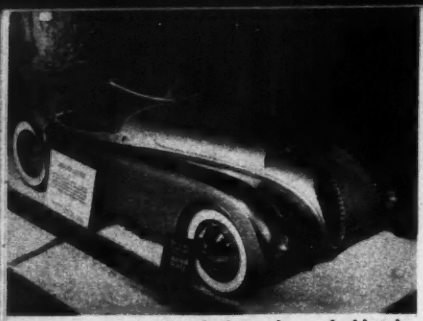
● *Center display in the Douglas sports car club booth was this immaculate '34 Ford street job.*

● *Allied Fiberglas products' latest innovation is this roadster body to be on the market soon.*

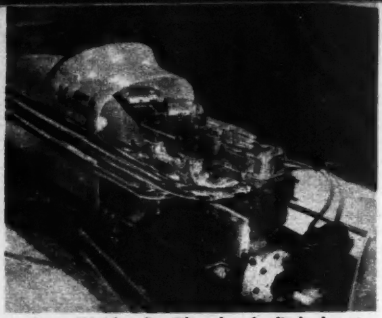


● *Bob Montgomery's special V8 Crosley powered roadster was masterpiece of chassis designing.*

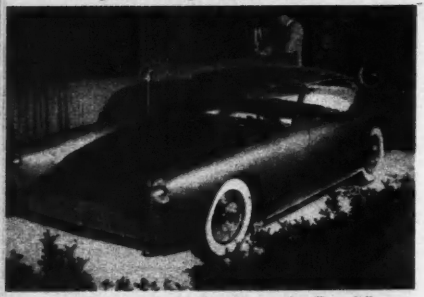
● *Dr. Gordon Gilbert's radical '50 Ford custom was brought from Phoenix, Arizona, for show.*



• *Jaguar fanciers had to do a double-take to recognize George Barris' restyled XK 120.*



• *Stan Weisbard's Fiberglas bodied dragster showed off its immaculate Cragar-8 engine.*



• *Jay Everett built this radically different aluminum bodied coupe, finishing just in time.*

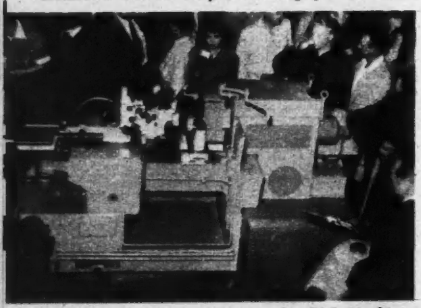
MOTORAMA continued

struction or in production and the cars proved it. They were all sorts, from one-of-a-kind to the Chevrolet Corvette.

Nor was the show confined just to cars. There were aisles full of exhibits showing accessories and the latest kinds of machining equipment. It could be truthfully said that if it weren't for the close cooperation among all concerned, such a show as Motorama could never be held. It was as much a spectacle of friendly interdependence of commerce and the backyard, of amateur and professional as it was a showcase of the nation's most spectacular automobiles.

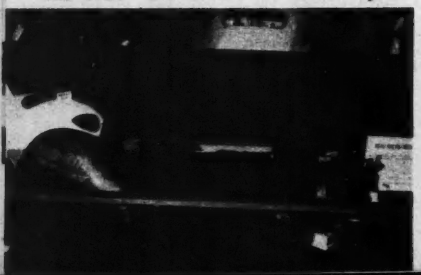
Above all else, Motorama was living proof that the automobile is never perfect. Each year new improvements have been added to the equipment seen, each year the cars get "better" if such a word can be used in describing automobiles that have been tailored to individual taste.

Perhaps Motorama is, in the last anlysis, like all other shows, a show of *people* as well as the cars they built. And perhaps, too, of the people who came to admire others' handiwork; without the enthusiast there would have been no Motorama. There would not have been any cars to put on display.

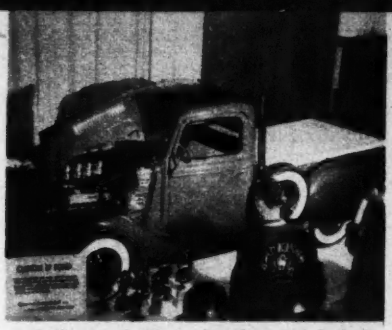


• *Unique display was put on by S&S Machine Tools with their new-type Polygon grinder.*

• *Two of the nation's fastest motorcycles, "The Brute" and Krant's H-D shared space.*



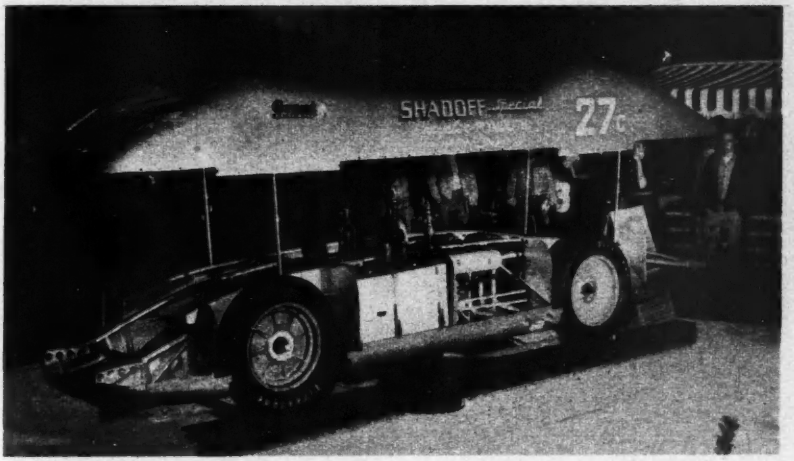
• *Ferrari-like Fiberglas sports car was built and shown by Dick Jones, was powered by Merc.*



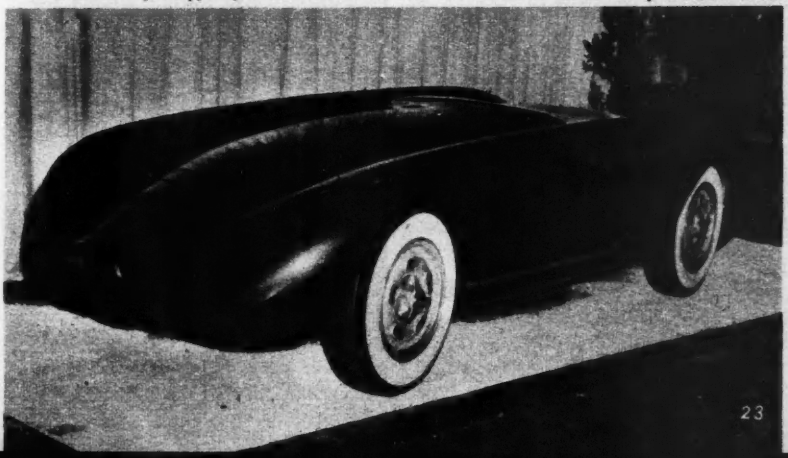
• *Brilliant red '37 Ford pickup was built by George Smith; displayed full-house Cadillac mill.*

• *"Oh for color!" Norman Rector's custom Ford sported orange paint and chromed Cad engine.*

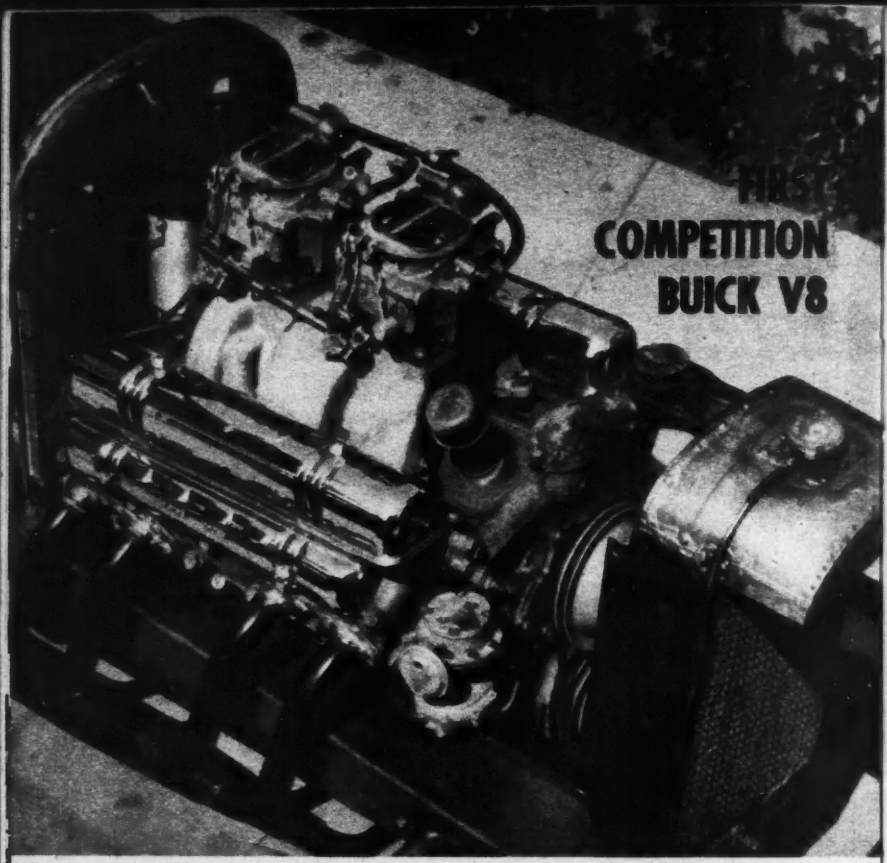
• *International record-holding Shadoff Sp'l was opened up so that spectators could see inside.*



• *Bob Sorrell's prototype sports car on Kurtis 500 KK chassis is slated for production soon.*

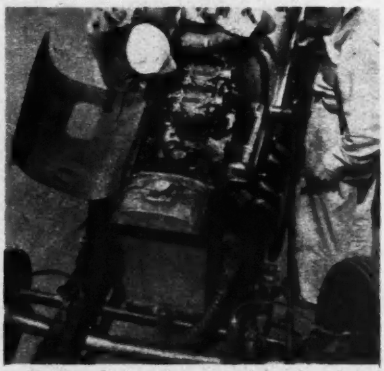


FIRST COMPETITION BUICK V8



• *Due to lack of time for experiment and AAA restrictions, Buick is a fairly mild form of conversion.*

• *Car is not of latest design but is well constructed. Here, the crew checks oil level.*



• *Radiator had to be reversed to allow large engine to fit into the chassis at last minute.*

Nail-Valve Special

Text and Photos by Don Francisco

ONE of the first of the new Buick V8 engines to be converted for use in a competition automobile is the engine installed by Dick Lehman, Glendale, California, in his Championship class race car. Dick entered his "Golden Engineering Special" in the recent Pikes Peak Hill Climb with the intention of running a GMC engine, but last minute difficulties in obtaining special engine parts prompted the hasty installation of one of the Buicks he had been using in his shop for experimental purposes.

Rules of the AAA, under whose sanction the Pikes Peak event is conducted, do not allow stock type engines of over 274 cubic inches displacement to be altered by boring their cylinders, changing their crankshaft strokes, or increasing their valve diameters. Other modifications, such as reground camshafts, higher compression ratios, heavier tension valves springs, additional carburetion, etc., are allowed.

The new Roadmaster V8, in its stock form, is rated at 188 hp at 4000 rpm. It has a cylinder bore of 4 inches and a stroke of 3.2 inches, providing 322 cubic inches of displacement. Its cylinder heads have "V" shaped combustion chambers, with both valves for each cylinder on one side of the V, and pistons with heads that project above the cylinder block, into the combustion chambers. The piston heads are shaped to match the combustion chambers and are designed to come within .080 of an inch of the combustion chamber walls when in top center position.

The entire engine was designed to occupy the smallest possible space and to be as light in weight as Buick's standards of reliability would permit. Success of the engineering done to hold weight to a minimum is indicated by the engine's 623.9 pounds, complete with all accessories and Dynaflow flywheel. Of the present group of modern V8 overhead valve engines of over 300 cubic inches displacement, the new Buick weighs the least. Weight is a big factor when an engine of this type is being considered for installation in a competition automobile.

The stock 8.5 to 1 compression ratio of Buick V8 engines used in combination with Dynaflow transmissions is the maximum that can be used in a passenger car running on premium gasoline, but it is far from adequate for an engine to be run in a competitive event that starts at an altitude of 9,000 feet and finishes at 14,000 feet. The rarified air

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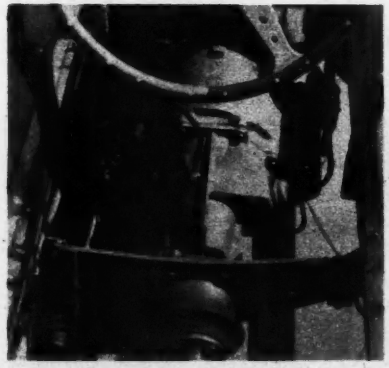
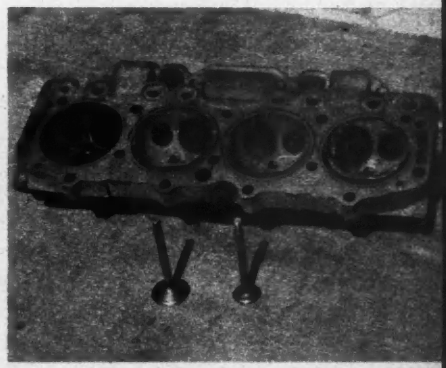
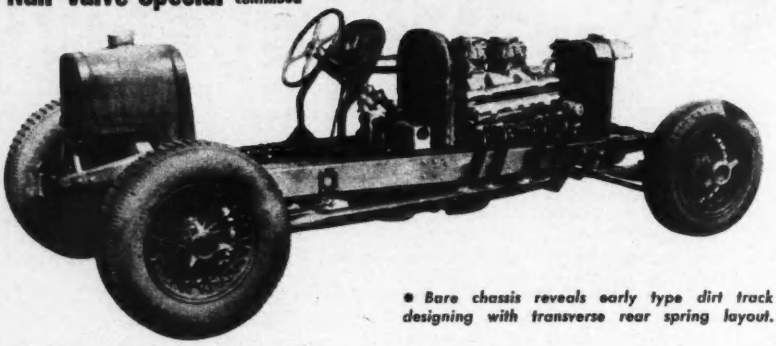


• *Dynaflow transmission makes heavy but neat installation. The large pedal at left is brake.*



• *One of peculiarities of new Buick head is nail-like exhaust valve measuring only 1¼ inch.*



• Bare chassis reveals early type dirt track designing with transverse rear spring layout.

at these altitudes lowers compression and combusion pressures so drastically that an engine delivers but a fraction of its sea-level horsepower under such conditions.

Raising the compression ratio of a non-supercharged engine is the only method in which compensation can be made for increases in altitude, and the only practical method of raising the compression ratio of an engine with a combustion chamber design of the type used in the Buick is by replacing the stock pistons with a type with higher domes on their heads. However, Dick was unable to buy special high compression pistons for his engine on such short notice; therefore, he had no other alternative than to use stock pistons and try to gain additional compression pressure by milling the cylinder heads. To reduce skirt friction on the snugly fitted stock pistons, additional piston to wall clearance was provided by honing the cylinders to a diameter .005 of an inch larger than the piston diameter.

After a quick computation, it was decided to mill the heads .080 of an inch and polish their combustion chamber surfaces. This was done, but when the heads were reinstalled on the engine with standard embossed steel head gaskets, it was found that the lower sides of the piston domes hit the combustion chamber walls when the crankshaft was rotated. Sufficient clearance was provided at these points by replacing the single-layer embossed gaskets with standard steel and asbestos gaskets that raised the heads an additional .040 of an inch, but this reduced the effect of milling the heads to the equivalent of a .040 of an inch cut instead of the .080 inch cut. Dick estimates the present ratio to be between 9 and 9.5 to 1.

The most controversial point to date about the new Buick engine is the diameter of its exhaust valves. These 1¼ inch diameter midgets look like nails alongside the 1¾ inch diameter intakes. A 1¼ inch exhaust valve seems ridiculously small for an engine with 4-inch diameter cylinders, but Buick engineers say the valve size is adequate for the engine.

They say they compensated for the small valve head by opening the valve early and quickly in relation to bottom center piston position. According to these engineers, the most critical part of the exhaust event is the "blowdown period," the blowdown period being described as the part of the exhaust cycle between the time the exhaust valve first begins to open and the time the piston reaches a point slightly past bottom dead center. In other words, this is the portion of the exhaust cycle during which combustion pressure in the cylinder is forcing exhaust gases past the opening valve. This, of course, occurs before the piston starts its return trip to the top of the cylinder.

The engineers have found that a valve opening and port cross-sectional area sufficiently large to handle the blowdown period is adequate for the balance of the exhaust stroke. They further substantiate their conclusions by stating that the valve's adequacy was proved by testing valves of different sizes in the engine.

Dick couldn't enlarge the valves in his engine and stay within AAA rules, but he could, and did, polish the ports and passages.

Intake passages weren't too difficult to polish, but the exhausts were a problem. Because of the small dimensions, winding route and consequent inaccessibility of portions of the exhaust passages, it was practically impossible to improve their efficiency by polishing their surfaces.

Valve action was changed by installing a Winfield camshaft ground especially for the engine. Stock hydraulic valve lifters and valve springs were used with the reground camshaft. It is worthy of note that stock Buick hydraulic valve lifters, according to Buick engineers, will operate satisfactorily at engine speeds of 5300 rpm with intake valves, and at 5500 rpm with the lighter exhaust valves. These are unusually high speeds for hydraulic lifters to operate without pumping-up and holding the valves off their seats. Lifter pump-up should be avoided in these engines to prevent the possibility of punching a valve head through a piston because of the lack of clearance between the valves and pistons when the pistons are in top center position.

The carburetion setup on the engine consists of dual four-throat Stromberg carburetors on a "Golden Manufacturing Co." intake manifold.

This manifold was designed by Dick and will soon be placed on the market. It is a compact, well-designed unit that has proven entirely satisfactory for passenger car installations. 100 octane gas was used.

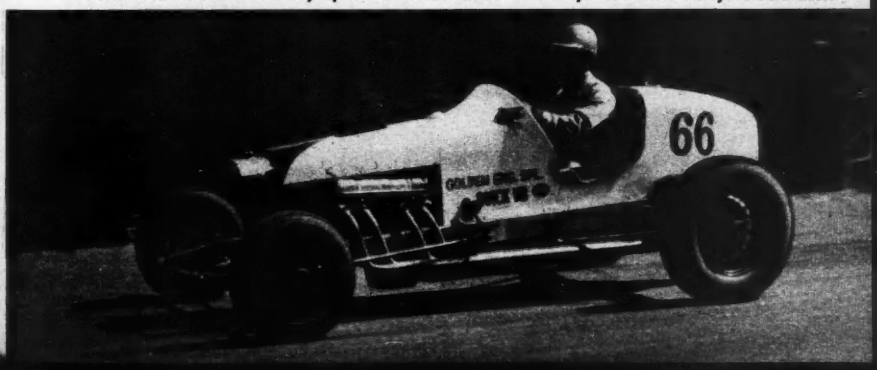
A Scintilla Vertex magneto was installed in place of the standard 12-volt battery ignition distributor. By being a self-contained unit, a magneto eliminate the necessity of carrying a battery in a car built strictly for racing. Exhaust headers were built for the engine to match the chassis.

A really unique feature of the car is its Dynaflow transmission. The Dynaflow was installed with the engine and is stock in all respects, right down to the steering column control lever. All driver Joe Garson had to do on the hill climb was stab and steer.

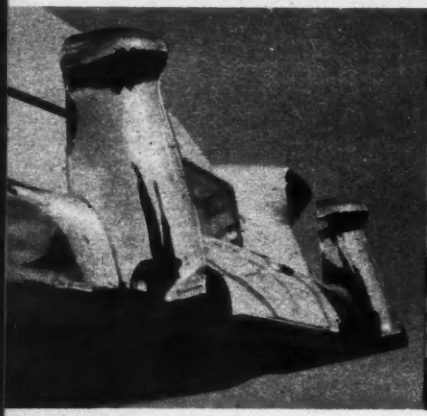
Performance of the engine was hampered during practice and qualifying runs by the tiny radiator which was designed for the chassis but not for the engine. Violent overheating was encountered every time the car was run on the Peak for practice and qualifying, but because fitting a new radiator was out of the question in the short time before the race was to be run, there was no choice but to run the engine hot. However, for some unexplained reason, the engine's temperature on race day did not exceed 200 degrees. Ethylene glycol, which has a boiling point of 387 degrees F., was used in the cooling system.

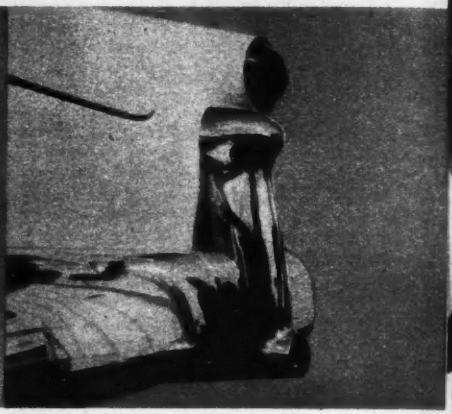
An interesting point about the car's chassis is that although it was built in 1937, the 1953 Pikes Peak even is only the second time it has been run in competition. Unfortunately, this project was started too soon before race time for all the bugs to be worked out of the car so its full potential, whether good or bad, could be tried on the tricky Peak, but lessons Dick learned this year are already being put to use in preparation for next year's assault. The same engine and transmission will be used next year, but a new quick-change rear axle assembly, of Dick's design, will replace the Model A used this year, and larger brakes will replace the rear Ford hydraulics. Also, an oil cooler will be added to the engine's lubrication system, and a larger radiator will help cool the engine.

• *Driver Joe Garson on his way up mountain. He didn't hit money but there's always a next time.*



TORCH TIPS





By Dick Day

A FEW weeks ago, while down in San Diego, California, we dropped in at Roberts' Body Shop and caught the crew in some very clever exhaust tip restyling. In the past we have seen many gimmicks on re-routing the exhaust pipes of a car and re-positioning the tips for appearance as well as practicability. Several automotive accessory companies have on the market at the present time custom-made bumpers with built-in exhaust tips. These were originated for cars that had been drastically lowered. Since that time they have met with such approval that almost all custom car owners have had them built or installed on their own cars.

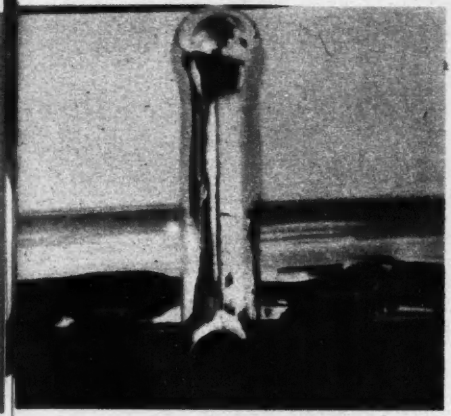
The unique arrangement that "Robbie" has incorporated at the rear bumper is the combination of the exhaust pipe's tip with the bumper guard. "This," explains Robbie, "has several advantages. For instance, the bumper does not have to be removed, only the guard. The cost of having the reworked guards re-chromed, compared to a bumper, is about one-third. We can reach the same effect and appearance that is obtained in the bumper tip set-ups and also, we can raise the position of the tips by merely recessing them up into the bumper, this we do on radically lowered cars.

Deadline time did not allow us to obtain a finish photo of the particular '49 Ford bumper guard being reworked in the story after it had been rechromed and installed, but we were able to procure completed shots of the same innovation applied to a '52 Chevrolet. Comparing these photos, you will note that like most custom gimmicks it may be adapted to all makes and models.

RIGHT

1. Before removing the bumper guard, make a rough measurement on what length the new tailpipe tip will have to be; also decide how much of the bumper guard's lower end will have to be cut off to allow the tip to be horizontal. The tailpipe tip should be slightly oversize compared to the stock pipe, enabling you to use clamps when connecting the two. In most cases the bumper guards will not be directly in line with the already installed tailpipes, to remedy this a small S-bend will have to be built as shown in later photos. The tailpipe pictured above is approximately 12 inches long and 2 inches in diameter. Size can vary.

"BUMPER GUARD EXHAUST TIPS"



Photos by Eric Rickman

2. When the position of the tailpipe tip in the bumper guard has been determined, remove the guard and cut the lower end off. Grind the cut end smooth for a snug fit against the tip.

3. The tailpipe's tip may be left round in shape or it can be altered as the one in this picture. It was felt that an oblong opening would blend better with the '49 Ford guard so "Robbie" inserted the opening end in the vise and compressed it against a ¾-inch round bar. The bar kept the tailpipe at a uniform contour and later was used as a mandrel as shown above.

(Continued on Next Page)

TORCH TIPS continued

4. Because of the new tailpipe tip being slightly oversized, the joining end was bevel cut and hammered down to clamp stock pipe snugly.

5. The tip may now be welded to bumper guard. When securely welded, fill with brass, contouring both pieces together as one component.

6. Here is the bumper guard and tip completely welded together. Welded area should now be finished off with a grinder set up with 36 grit closed coat disc and then hand filed smooth.

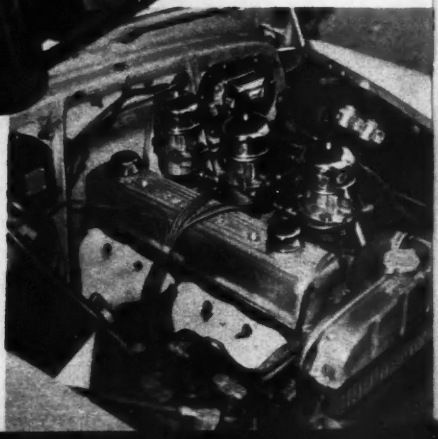
7. Bumper is cut to allow tip and guard, now one unit, to recess and fit against bumper.

8. This method is used when guard does not align with the exhaust pipe. A small S-bend pipe is made, enabling the two to be connected.

9. With job completed, except for re-chroming, you can see the clever arrangement that this gimmick affords the rear of your car when combining the bumper guard and exhaust tip as one.

WEBFOOT CHEVY

the custom with the unhurried look



• *ABOVE—25 bars from '51 Buick grille were used to give Chevy a unique frontal aspect.*

• *Engine has been given the full treatment with Wayne 12-port head set-up and ⅝ cam.*

• *Major changes in car have been confined to grille treatment and to moulding in of rear fenders.*

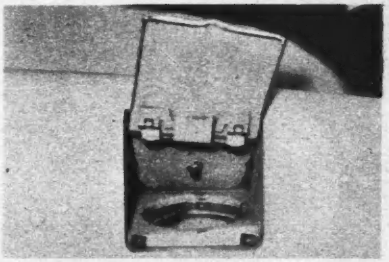
by John Christy

THE approach to customizing need not necessarily be wild, futuristic or radical. The prime requisite of a good job is that of use coupled with good workmanship.

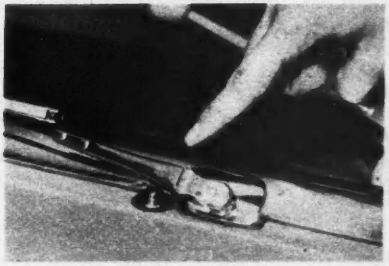
A case in point is the clever job done by Jack Wilkins and Jim Comstock, of St. Helens, Oregon, on Jack's '52 Chevrolet coupe. The car is one of those double-take jobs. You know something has been done but you don't quite know what until the second look.

The major changes were made in the grille and in the rear fenders. In the case of the grille, the stuffings were removed and replaced with 25 '51 Buick upright bars, lending the frontal aspect an air of quiet elegance. The rear fenders were altered slightly but effectively by the addition of a pair of '51 Olds "98" taillights which were molded into the top rear curve of the Chev fender. The nose and deck were shaved and all external latches were removed. Completing the externals, a pair of rectangular exhaust tips were let into the rear bumper; the car was then lowered a conservative three inches with blocks in the rear and cuts in the front springs.

The inside of the engine compartment, though, is a different matter. A Wayne conversion, boasting all the little things that go with this type of 12-port set-up, gives the car the git-up and scat that the looks promise. A comparatively mild compression ratio of 8¼ to one and a Harman-Collins road cam leave the car useable for street driving yet give it enough scoot to go through the standing quarter at the drags with a speed of 78.23 mph. Not at all bad for a "transportation" car.

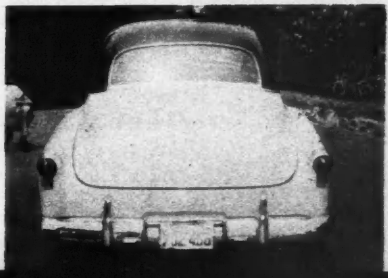


• *Button operating trunk lid solenoid is concealed in the gas filler lid in the rear fender.*



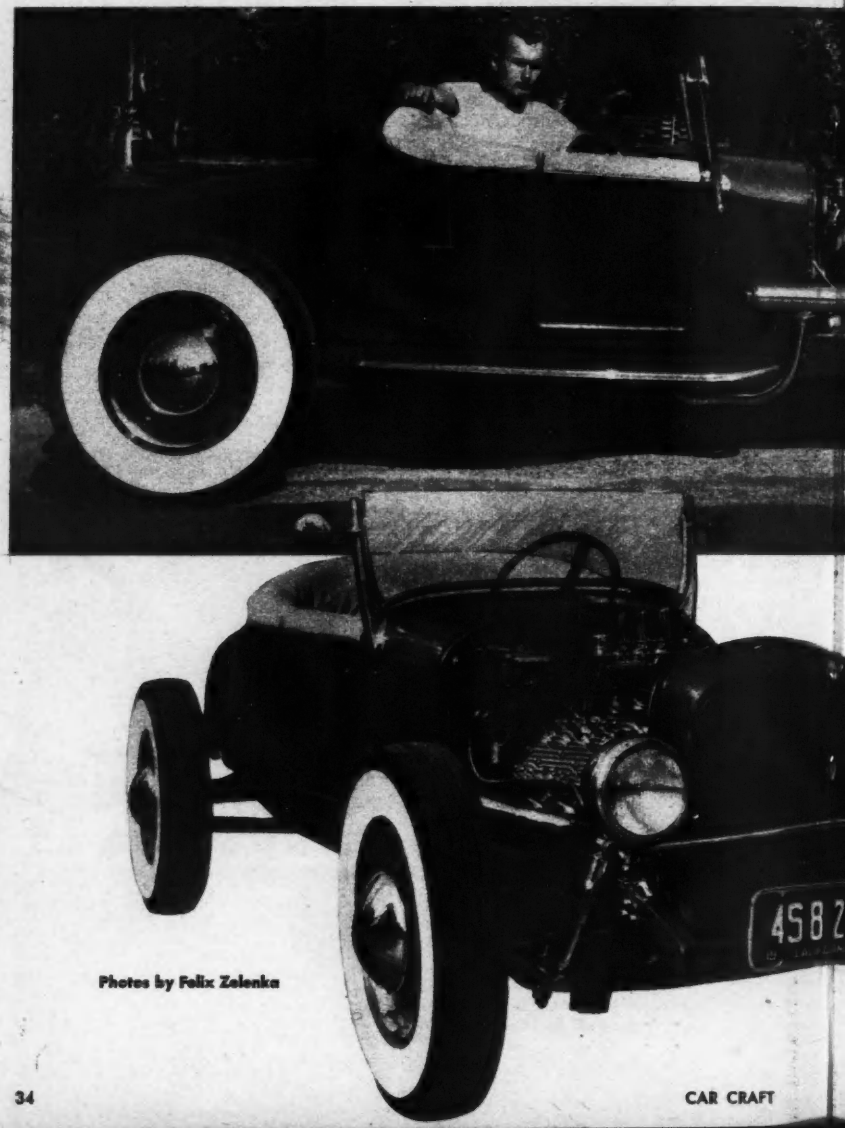
• *Door solenoid buttons are also concealed, being placed out of sight under wiper blades.*

• *Deck has been completely shaved and Olds tail lights set into fenders. Note the exhausts.*



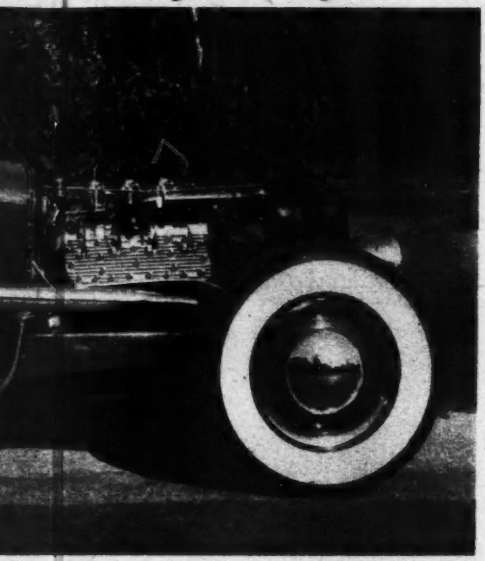
COVER CAR

ROADSTER?...



Photos by Felix Zelenka

?...man, you've just said the magic word!



WITH some ninety percent of the supply of '27 T bodies used on track and lakes machines, most of which have gone where all good little roadsters go, Don Chapman's little crimson beauty is not only a standout but a rarity.

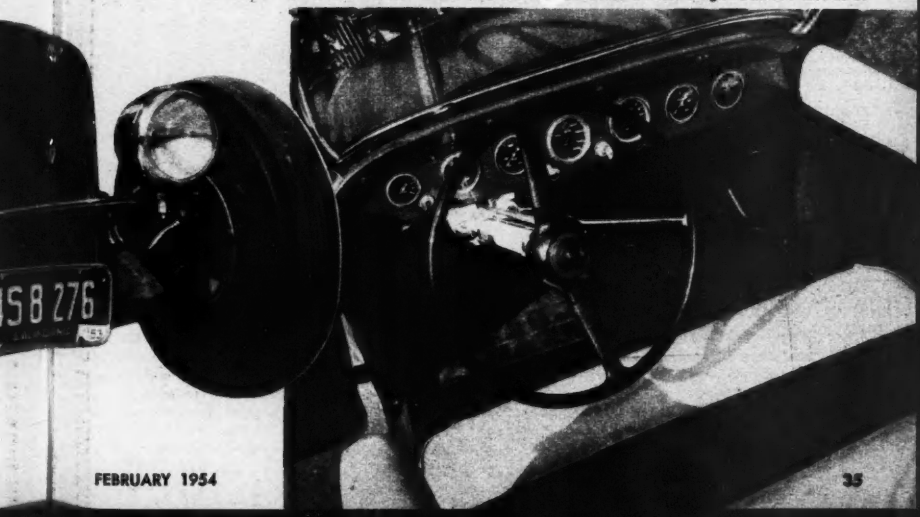
The car was originally put together by Sal Machia and Lou Banto (partners in a Los Angeles service station) who are noted for turning out immaculate equipment.

The main problem was in mating the T body to the Deuce rails. The rear and center cross-members had to be removed to narrow the frame to the dimensions of the body. Sal and Lou shortened the rear cross-member and made a new center member from two pieces of angle iron, positioned to bring the engine back approximately six inches from the stock position. The front frame horns were boxed and connected by a tube cross piece. When finished, the dimensions were such that the body dropped over the rails to a depth of three inches.

Instead of merely assembling the car and

(Continued on Page 37)

• *Upholstery is in dark red and white rolls and pleats. Carpeting is also done in dark red with leather covered areas around the pedals. Note rear view mirrors on each side of the windshield and large exhaust headers.*

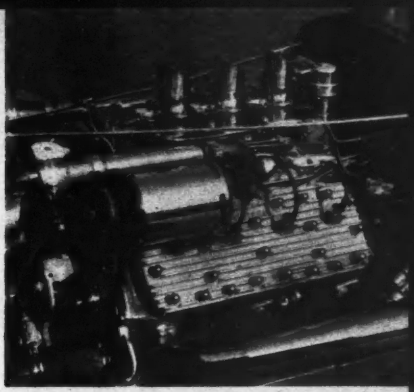


● *Front frame horns have been boxed and front crossbar contoured. Front brakes and spindles are late Ford and axle is dropped '32. Headlights are sealed beam units mounted on special made brackets. The radiator was built from an assortment of parts which included a Chrysler core and late model Ford radiator bottom tank. The core was cut down in size and lower outlets were soldered in place to allow hoses to clear front cross-member. Top inlet, filler neck and rod bracket were added.*

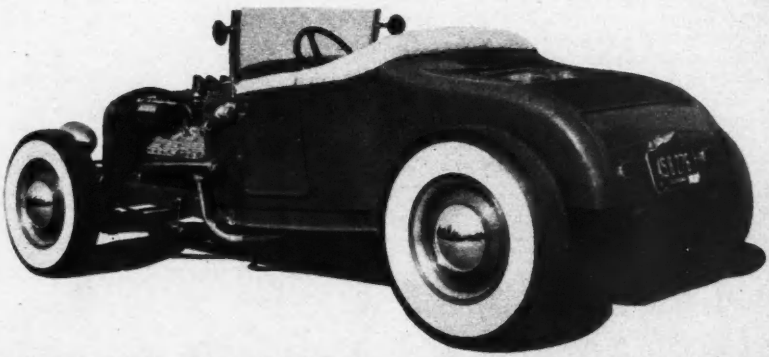
(Continued from Page 35)

then proceeding from there, the builders made a rough assembly job to check the positioning of all the components. Then they tore the whole thing apart. Each piece was then meticulously reworked and finished. Even the frame was filled, primed, lacquered and rubbed to a gloss that matched the sheen of the body. With every piece finished separately, there isn't a single part of the car that doesn't match the attention given to the externals. All parts not lacquered are chromed.

About two years ago the original owners decided to build another car and Don Chapman became the new owner of the little red jewel. Many owners of second hand equipment either let their purchase go to the dogs or else they are tempted to attempt revisions that may or may not be successful. Don, however, was content to let matters rest insofar as the body and chassis were concerned, giving the car the same loving care that it was used to having.

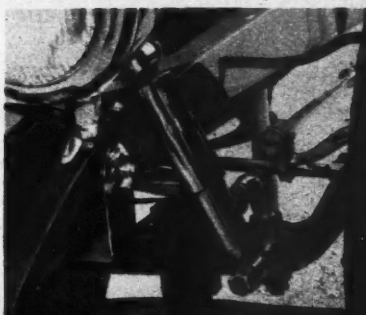


• *Powerplant of the little red bomb is a 286 cu. in. Merc which has been stroked 3/8, bored 3 5/16, ported and relieved. Howard M8 cam, 9 to 1 Weiand heads, triple carburetor Weiand manifold with three 97 Stromberg jugs, J. E. pistons, Kong ignition are used. Engine exterior equipment is either chromed or highly polished.*



• *Alterations to body include turtle deck that has been molded into the bucket body. Original inserts for the back wheels have also been filled into the body with sheet metal and then smoothed. Chevrolet tail lights are installed in the rear deck panel along with license plate bracket, cowl vent in front of the windshield has been filled-in. Rear end is a '40 Ford with 3.54 gears. Tube shocks are installed at 30° angle at rear. For town driving, the chromed exhaust headers have bypass tubes which lead back through mufflers. Large plugs in ends of the stacks may be removed when used in competition event.*

The engine was another matter. This one got the works. The original mill had been a reasonably mild job for tooling around town. Don turned the thing into a full house piece of gas burner. Instead of mild, this one was wild — wild enough to crank on 105 mph on gas in the standing start quarter-mile. The little orphan really found itself a home.



• *Detail view shows workmanship on frame and front crossbar. Note mounting on headlights.*

Garage Gimmicks

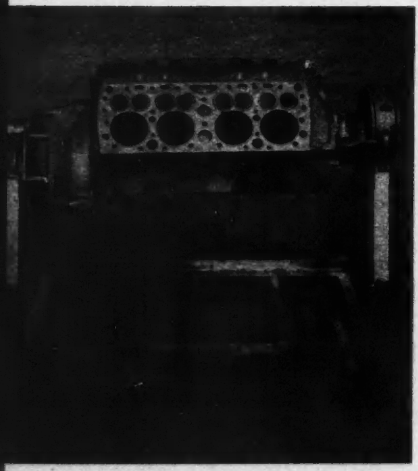
Photos by Tom Medley

BUILD AN ENGINE STAND

ONE of the most indispensable items of shop equipment, if one is going to do any major engine work, is an engine stand. This little item allows one to hold any block steady and at the proper height and angle for efficiency. If you've ever tried to wrestle a 300-pound block around on a bench you'll know what we mean.

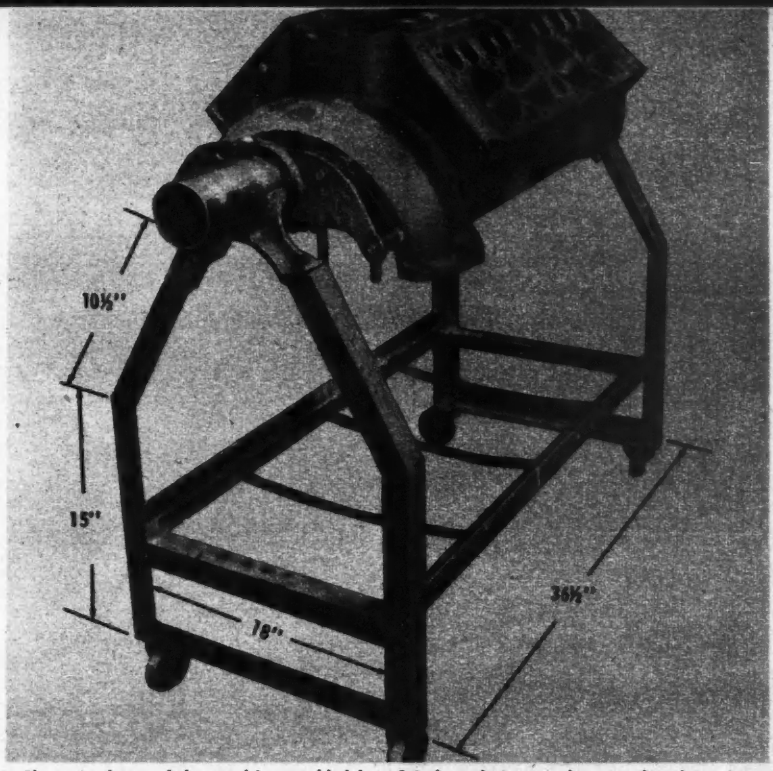
There are two methods of acquiring an engine stand for your own garage: purchase one for not too great a sum or build one yourself out of scrap. If you live next door to a store that handles engine re-building equipment and have a spare 20 bucks or thereabouts, the former way is the quickest. However, if you live in an area where shipping costs add considerably to the price of equipment the latter way is best.

All you need in the way of material is about 20 feet of two-inch angle iron, four feet of 3/16 by 2-inch strap, approximately two square feet of 3/16 plate and a six-inch length of '35 or '36 Ford drive-shaft. Most of this stuff can be found in any scrap yard



• *This particular engine stand is of sufficient length to take any V8 or four cylinder block as well as some sixes. Stand can be built almost entirely from 2-inch angle iron, 2 by 3/16 inch strap and 3/16 inch plate at very little cost.*

• *Block supports can be purchased for just about any make of engine as were these, but they can also be made up from two to three-inch strap. Unless you have access to a metal shop it might be best to buy the castings.*

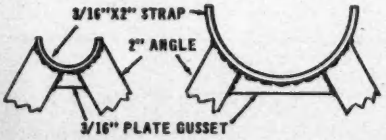


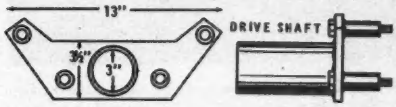
• *The entire frame of the stand is assembled from 2 inch angle iron as shown in this photo. Straps on lower frame may be omitted or replaced by a metal tray. Any type heavy duty caster can be used.*

worthy of the name or in any large country machine shop catering to farm equipment or small industry.

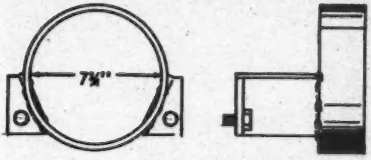
The dimensions and fittings shown here are for use with a Ford or Merc block. However, if you desire to work on another make of engine, the fittings can be altered to fit the mounting arrangement of whatever engine you wish to use. Since these dimensions are fairly standard, the mounting brackets for different engines might best be purchased from a manufacturer of rebuilding equipment.

Just as an afterthought, for those who like to be different, the angle iron can be replaced by two-inch iron pipe or tubing.





• *Bell-housing support may either be purchased or fabricated from 3/16 plate and six inch length of drive shaft as shown here.*



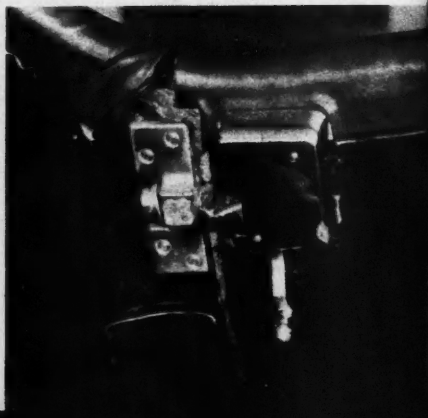
• *Front end support is also available but may be fabricated from 2 by 3/16 inch or heavier strap iron. Note wider measurement.*

• *LEFT — Top pieces of engine stand are easily made from strap iron or from half-round pieces of tubing. Pieces should be gusseted.*

Photos by Bob D'Olivo

• Cockpit of roadster is sleek but not cluttered. Instruments are Ford group, S-W tach.

• Chrome hinges are made of motorcycle handlebar material giving sturdy support to door.



• The door latch problem was nicely solved through use of easily obtainable MG catches.

Stude Sportster

PRETTY ENOUGH TO BE A MOVIE STAR

By John Christy

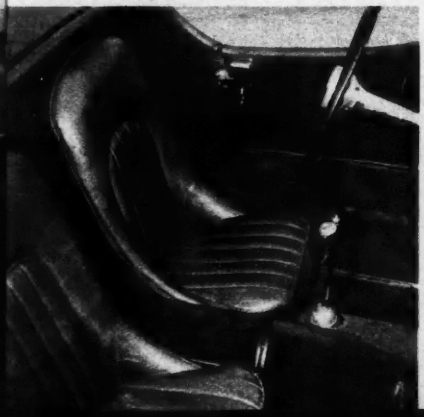
PRETTY enough to be a movie star would be one way to describe Virgil Rice's "streetliner." The car was picked as one of the leading players in the upcoming Universal road racing picture "Johnny Dark," and deservedly so. The buggy is immaculate and not at all sluggish.

Rice started with a new Fiberglas body that just recently hit the market, known as the "Victress." The name is not far-fetched either in the light of the fact that an all-out competition machine with a similar Victress body shoved the Bonneville Nationals sports car record through the roof to hit 203 mph for a two-way average.

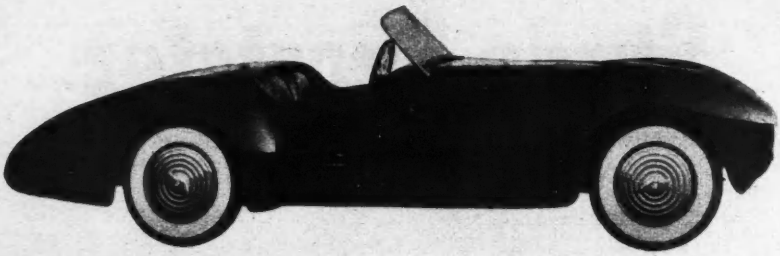
Since the body was designed for a 102-inch wheelbase and 54-inch tread, Rice cut a '39 Ford frame down by 10 inches. To bring the engine mounts back to the proper point,

(Continued on Next Page)

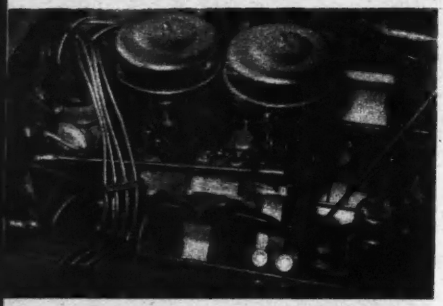
• *Seats are inexpensive aircraft surplus units which were upholstered in rich maroon leather.*



• *Pedals are of Kurtis manufacture and are swung from firewall a la '52 and later Ford.*



• *Side view shows where "streetliner" gets its name. Aerodynamics of body were proven at Bonneville.*



• *Stu-V equipped Stude V-8 which has been given the ¾ race treatment supplies punch.*

• *Suspension is standard '39 Ford, modified to take tube shocks. Steering has tractor arm.*

• *Grille actually acts as a bumper, floating free in nose and held in place by hefty tubes.*

STUDE "STREETLINER" continued

the X-members were cut out and moved back, allowing the engine to be moved to the rear and down between the frame rails.

Rather than run the body brackets from the body to the frame, Virg did just the opposite, permanently attaching the brackets to the rails, thereby allowing the use of short, very sturdy body mounts.

The suspension system, with the exception of the shock absorbers, was pirated bodily from the '39 as was the steering layout. For cinching the car down, Rice chose Swanson-converted 50-50 Gabriels. In order to get the steering column down to the proper location two universal joints were set into the shaft. The standard pitman arm was tossed out the window and a Ford tractor arm used when it was found that the tractor arm would fit perfectly on to the '39 sector shaft.

For running gear, Rice used the Ford brake and hub set-up with safety rim Chrysler wheels scrounged from a junkyard.

Into the engine compartment was stuffed a Studebaker V8 mill reworked with Stu-V dual intake manifold, ¾ cam, domed pistons and dual exhausts to produce a nice 160 horsepower. The push is transmitted through a side shift gearbox which is controlled by a floor shift lever and top-plate connected to the side shift by rods with Heim bearings at each end. Handling the shift gives the impression that it was always meant to be that way; it's solid and quick with a positive feel as it goes into any gear.

Over all these goodies the Victress body fitted like a glove. Floorboards are of heavy plywood and the firewall and rail covers are of aluminum. A carefully fitted black floor rug covers the construction work. Seats are ordinary aircraft buckets covered with pleated black leather upholstery.

• *Cockpit affords plenty of leg room for six-footer Rice. Note convenient remote gearshift.*

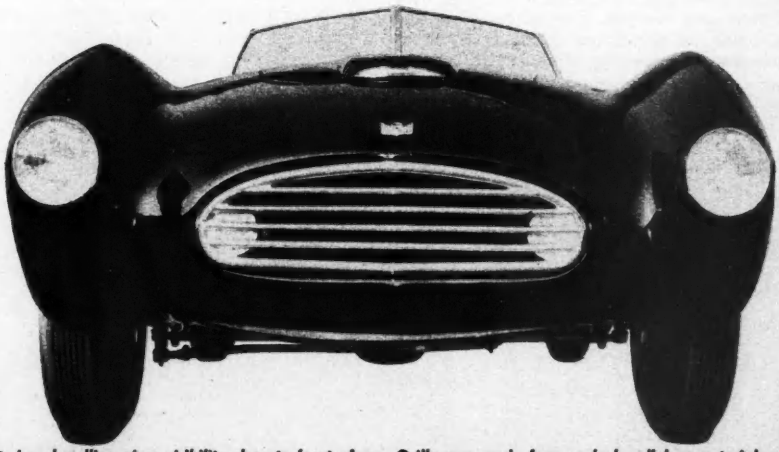
• *Chevrolet tail lights are mounted high on rear deck to comply with state vehicle code.*

To save trouble in fitting linkages, Rice used Kurtis pedals and hydraulic controls for the clutch and brake systems. The pedals swing down from the firewall a la late model Ford. As a result, operation of the super-stiff clutch is as easy as if the clutch springs were made of sponge rubber.

When using a Fiberglas body one can use as much or as little trim as is felt necessary. Virg felt that the absolute minimum was ideal. As a result the only trim is the combination grille and bumper which was built at the Hellings Company where Rice earns his daily bread as general manager. The grille, made up of chrome plated steel bars, is not attached to the body but to the frame, floating free in the nose opening.

The only other bit of trim is in the Chevrolet taillights mounted high on the rear deck to conform with the height requirements of the California vehicle code. The exhausts protrude unobtrusively through the rear fenders. There are no latches in sight, the doors being operated by MG latches on the inside and the hood being held securely by Dzus fasteners. Even the dash is plain, being made of scrubbed ash finished in black with silver graining. All the instruments except the speedometer are located in one big dial called a Vac-Tac by Stewart Warner.

All in all, the car is one of the finest pieces of combination street and competition equipment that we've yet seen. To sum it up, the car is one of those rare machines that just plain feels *good* to drive. For smooth looks and useable performance we have yet to see a machine from across the pond that has it beat.



• *Low hoodline gives visibility close to front of car. Grille was made from cycle handlebar material.*

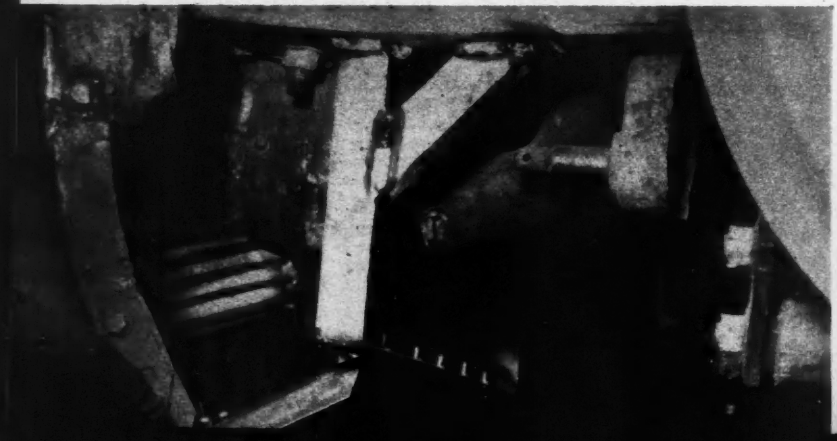
Channeling a '39 Merc – Part II

Text and Photos by Bob Behme

EVERYBODY knows Cinderella has a fairy godmother and that Little Orphan Annie has her Daddy Warbucks and, as we explained last month, Glen Hooker, Burbank High School student, has an uncle who is a partner in one of California's finest custom shops; the Valley Custom Shop of Burbank.

Together with his uncle, Neil Emery and Neil's partner Clayton Jensen, Glen got his '39 Merc pretty well on its way to completion by the time CAR CRAFT picked up the second part of the story. The body had been cut free and dropped or channeled around the frame three inches. This put the bottom of the body (minus the running board) even with the frame rails but it placed other areas of the body below the frame and away from necessary support.

1. This was especially noticeable along the front where the bottom of the grille now extended three inches below the frame. Proper support for the grille was important because the frontal area of the fenders is supported by the grille. In order to create the necessary support it was necessary to build a "U" shaped brace from angle iron. The open ends of support were welded to frame rails. The base of the bracket was placed on top of the lower edge of the grille, then bolted to the bracket for support.



2. Just aft of the grille, the side panels, which serve to close off the engine compartment from the front wheels, were now three inches below their stock position and interefered with the suspension operation. Neil cut the panels, back to their stock position. He provided room between the panels and the frame for the brake lines, then bolted the panels to the frame. This panel, like the grille, provides front fender support.
3. The body was lowered around the frame. This necessitated cutting the floor section away from the frame and dropping the outer edges of the doors below the frame. Plans were to fill in this gap with a new box section. This project was now ready for completion. It was a relatively simple operation. Two strips of 18 gauge steel were cut to size: one to fit between the door uprights from the base of the drop to the new floor level, the other from the new outer wall to the floor. These strips were welded in position. *(Note — see Part I, Jan. CAR CRAFT.)*

(Continued on Next Page)

HERE'S HOW continued

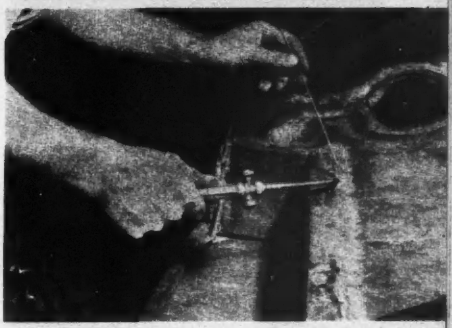
4. The stock rear wheel wells on a 1939 Mercury convertible jut from the body panel, inside the trunk compartment, at about 45° angle. After Glen's car had been channeled it was found that the angle of the wheel well was not sufficient to provide enough room for proper wheel and spring movement. Rather than try to modify the existing wheel well Neil planned to remove the stock well and construct a new well which would have steeper sides, about 90° angle. The new well was constructed from 18 gauge steel.

5. The box-like wheel well section was constructed on the work bench then attached in position. The top of the well was placed higher than stock and the trunk braces were cut to fit. The base of the new well section was fitted around the frame. The floor section was then welded to the center of the new well.

6. At the rear of the car the tail panel section was too low, too thick and beat-up as well. Since the car's frame had been "Z-ed" this operation had rerouted the rear frame members to the extent that the back of the rear cross-member was six inches short of the back of the car. This 6 inch gap left a hole the width of the trunk which was more annoying than tacks in the bathtub. The gap should be filled to provide adequate strength for the extreme tip of the trunk areas, Neil pointed out to Glen. It was decided to cut away the rear center trunk section and build a new box or step-like construction to fit into this area and re-locate the trunk fastener.

7. This cross-member is important for two reasons. First, it stiffens each of the rear fenders and serves to keep them in proper alignment. Then, at the same time, it provides a support upon which the rubber seal may be secured to make the lid joint water tight.

Neil replaced the stock tail section (the cross-member trunk brace), with a thinner channel strip which he made from two sections of angle iron welded together in a "U" shape. Since it was necessary to fill in the gap between the rear of the trunk and the frame ends, Neil cut out 18 gauge steel in the form of a box which he stuffed in position behind the angle iron trunk brace and the frame cross-member. The front edge of the base of the box was cut long enough to extend in front of the channel brace. The metal was bent over the channel iron in a water tight lip.



8. The box section was not welded until the parts were fitted together inside the trunk. The top of the box was bent 90° to the wall and aligned with the trunk floor. It was welded along this line.

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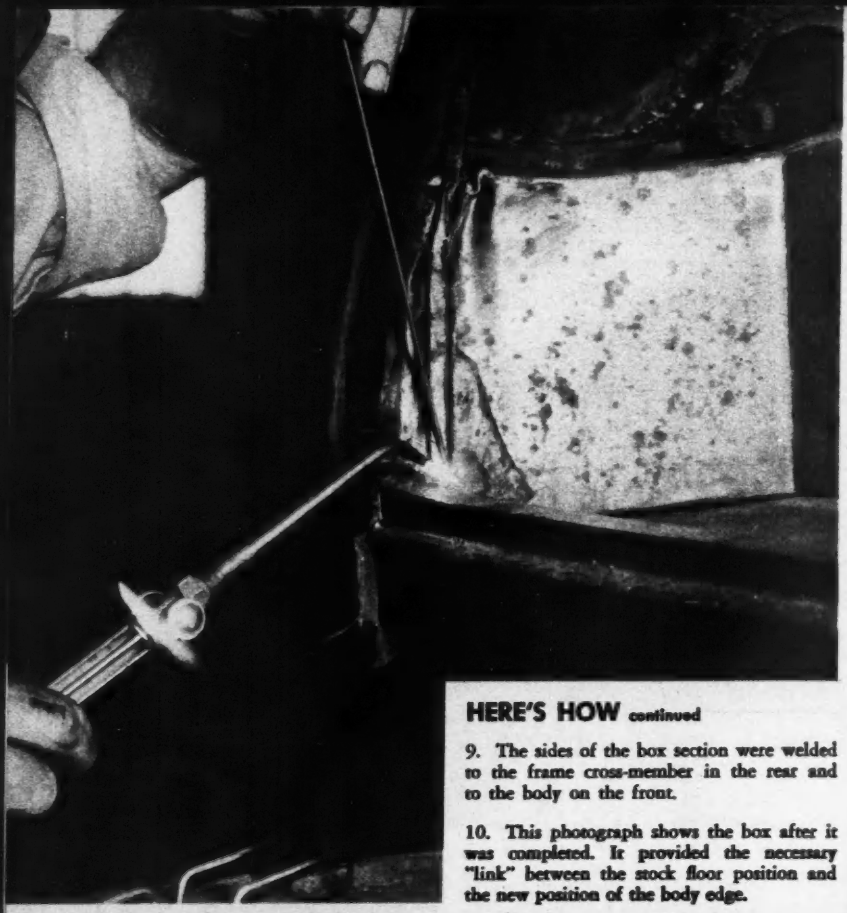

HERE'S HOW continued

9. The sides of the box section were welded to the frame cross-member in the rear and to the body on the front.

10. This photograph shows the box after it was completed. It provided the necessary "link" between the stock floor position and the new position of the body edge.

11. This shows how the box section was designed to "plug" the gap between the frame cross-member and the rear of the body.

12. All fenders were remounted to the body in stock position. However, they were not to remain stock for long. Neil felt that since the body had been channeled and the fenders dropped three inches, the profile would be more pleasing and modern if the fenders were clipped three inches.

Glen had been helping his uncle around the custom shop for several months prior to the beginning of the construction on his car. During that time he'd watched construction of "full circle" fender cut-outs on other Valley Custom cars and he had liked the effect. As long as the fenders on his Merc had to be trimmed then he decided he wanted full circle cut-outs as well.

(Continued on Next Page)

HERE'S HOW continued

13. "Full circle" fender cut-outs were an improvement on Glen's Merc for two reasons, Neil felt. The '39 Merc, he pointed out, was actually a pioneer in the trend toward small fender openings. This made the Merc wheels particularly difficult to remove. Secondly, Neil felt the contour of the new full circular fender opening followed the contour of the wheel and seemed to make a convertible more of a modern sports car, giving it a free, open design with a custom flair. Glen agreed.

The cut-outs were made by using the axle hub as the center of the circle. An arc was scribed on the fender using this procedure. The arc was comparable to the tire's size. Then the fender metal was cut away along the scribed arc. After the metal was removed the fender opening was smoothed or given a finished look by the construction of a flange or "beading" by using a body hammer and a beading dolly.

14. After the edge had been completed it was smoothed up with a curved body file. Then the fenders and body were sanded, primed and sanded again. Glen was to make the final decision about color in a short time and Neil promised him he'd be the hit of Burbank High in his new car. Looks like he was right.

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the truth about
FORDOMATIC

by Chuck Eddy

Illustrations from information supplied by Ford Motor Co.

Part 1—HOW IT WORKS

THE object of this little opus is to shed some light on the various factors affecting the performance of Fordomatic and Mercomatic equipped cars. As the average owner and mechanic is at loss to understand the inner workings of these gearboxes, they are blamed for much that is actually not their fault.

Consequently, many so-called authorities have advised against the use of Fordomatic with highly tuned engines. This is a sad state of affairs (as we will attempt to show) because the characteristics of this torque converter and planetary transmission combination lends itself to use with very potent mills, WHEN PROPERLY ADJUSTED. To enable the reader to better understand the problem, we will first explain how the Fordomatic normally operates and, in the second of the series, how this knowledge may be applied to an engine on the "verge of an urge."

THE CONVERTER

This piece of machinery could easily be termed a "crazy, mixed-up pump." Actually, the public is "mixed up" about the way this pump really operates. As the term "hydraulic" means to employ a fluid to do work, this hydraulic torque converter must operate completely full of fluid at all times. In the Fordomatic, this is accomplished by circulating fluid through the converter under a pressure which is regulated by "damming-up" the rate of fluid's return to the sump. As this *converter pressure* does not radically vary the converter's performance, any change from specification 20 to 45 pounds per square inch will not materially change converter function. In fact, if it were not for the necessity of utilizing the converter's external fins as a means of directly cooling the oil, we could easily seal it full of oil and not greatly impair its function.

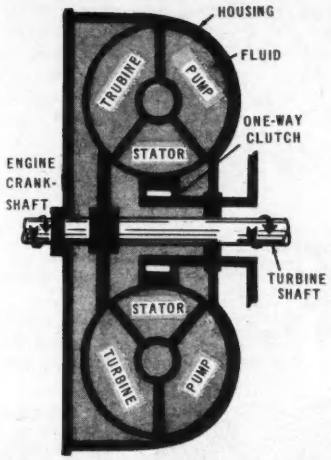
To make clear what the primary function of the converter is, let us use some analogies from a normal drive system. Most of us realize that various ratios in a standard transmission are necessary to multiply the engine's torque under various load requirements. In a Standard Ford passenger car transmission these ratios will be 2.78:1 in 1st, 1.6:1 in 2nd and 1:1 in high. These will accomplish torque multiplications of 2.78 times in 1st gear, to start the car moving and handle heavy loads; and 1.6 times in 2nd, to furnish enough torque for acceleration and medium loads. As most normal 3rd gears are 1:1 ratios, this means that torque is unchanged through the transmission in high gear. In a sense then, these gears are fixed torque converters! However, as no engine could deliver sufficient torque to turn the rear wheels, even with its torque multiplied almost three times in the transmission, it must undergo further increase in the rear axle. The ultimate torque increase then will be the ratio of the transmission *times* the rear axle ratio. This figure of overall gear ratio indicates the general performance capabilities of any automobile, when also taking into consideration vehicle weight (load) and torque available at the engine. A comparison of overall gear ratios in a standard transmission car and a Fordomatic will serve to illustrate what additional function the torque converter must fulfill.

Trans. Ratios	1st Gear	2nd Gear	3rd Gear
Std. trans.	2.78	1.6	1
Fordomatic	2.44	1.48	1

Overall ratios=Transmission ratios x Rear Axle ratios

Std. trans	2.78x3.9 =10.84	1.6 x3.9 =6.24	1x3.9 =3.9
Fordomatic	2.44x3.31= 8.08	1.48x3.31=4.90	1x3.31=3.31

Obviously, if the performance of a Fordomatic depended on the above overall ratios alone, it would be inferior in any gear ratio to a standard transmission. This is actually not the case, as the converter is capable of additionally boosting the torque of the engine as much as 2.1 times. Under ordinary



• *Schematic diagram shows the internal construction of the torque converter.*

driving conditions, however, the torque increase ranges from 1.5 times down to 1:1. The most wonderful characteristic of the converter is its ability to deliver a torque "boost" upon demand. If no acceleration or heavy pulling loads occur the converter becomes an efficient fluid coupling with "slippage" as low as 3%.

Slippage, when applied to a converter, is likely to give the average reader the idea that the engine R.P.M. is lost, as it would be in a slipping clutch. Quite the contrary, this very slippage is the factor that produces a torque increase in the converter; in fact, the two are proportional. Thus, when we remember how poor the high gear performance of a '39 Ford was with a 3.54 rear axle, we can appreciate the contribution of the converter when we find high gear acceleration quite respectable with an even less favorable 3.31 rear axle in the Fordomatic. Any driving condition which forces the turbine or driven member to slow down will produce a torque increase in the converter because the difference in R.P.M. between driving and driven members is thereby increased. Thus difference in R.P.M. is actually an expression of the pumping rate of this "crazy, mixed-up pump." In short, the converter is actually a self-contained, automatic transmission which will deliver a moderate torque increase of about 1.5 times upon demand, and, when the demand ceases, transmit engine torque at a 1:1 ratio, with minimum slippage.

The cushioning effect of the converter makes a desirable contribution to engine smoothness, particularly on the later design engines in which block and crank rigidity is improved. Due to inherent characteristics of the torque converter, the engine can never be "lugged," but on the other hand it runs under much more constant load than in a standard transmission car. This loading makes itself evident on the spark plugs, which will show more nearly the coloration of a truck plug.

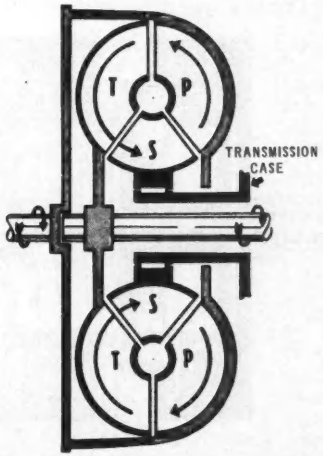
Most important to remember when considering any torque converter car is the necessity of exchanging engine R.P.M. within the converter to obtain extra torque to drive the rear wheels. Transmissions accomplish the same result with fixed ratios while converters produce infinitely variable torque ratios upon demand.

THE PLANETARY GEARBOX

A fully automatic transmission requires certain characteristics of the gear train which make the planetary type a virtual necessity.

A simple planetary gear train is so-called because of the similarity of its motion to the planets in our solar system. At the center

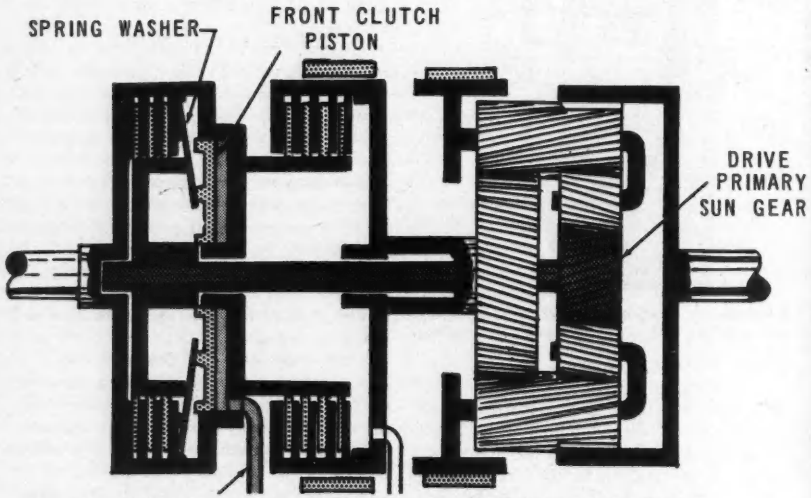
(*Continued on next page*)



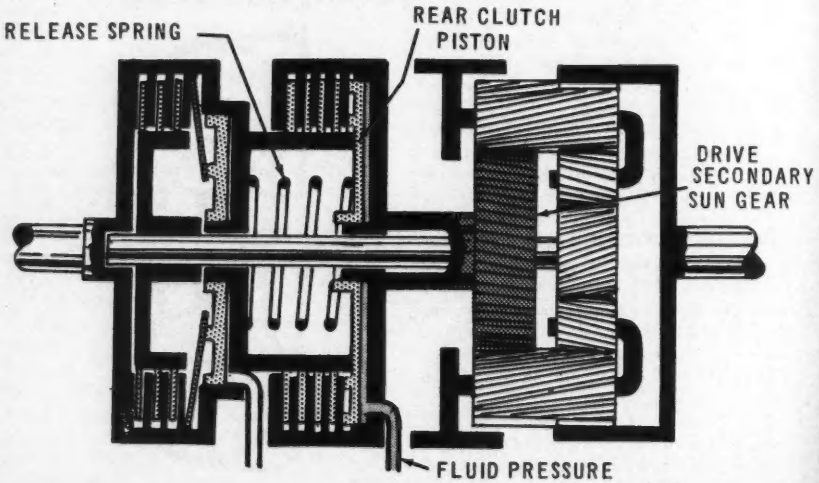
• *Arrows show the flow of the fluid as it moves through the torque converter.*

FORDOMATIC continued

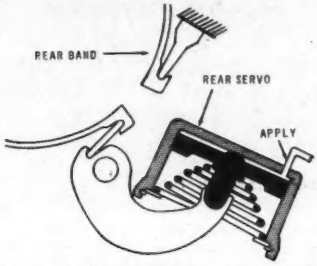
of the system lies the sun gear. Revolving around, and in mesh with it are relatively small pinions, called planetary pinions, which are supported by a rotatable spider called the pinion carrier. Encircling the planetary pinions, and in mesh with them, is the internal gear, so called because of its internally located teeth. Thus, we have a gear train consisting of three parts, *in constant mesh*, any of which *may* be held by external bands or driven by clutches. The beauty of planetary gear trains is that gear changes do not



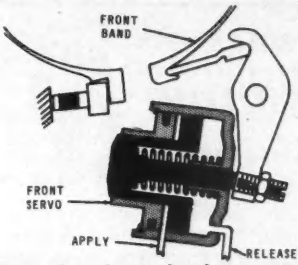
• *Here front clutch and rear band are engaged, putting transmission in low.*



• *With rear band and rear clutch holding, transmission is in reverse gear.*



• ***Servo unit operating rear band is similar to hydraulic wheel cylinder.***



• ***Servo for front band operates in reverse. Note band adjusting screw.***

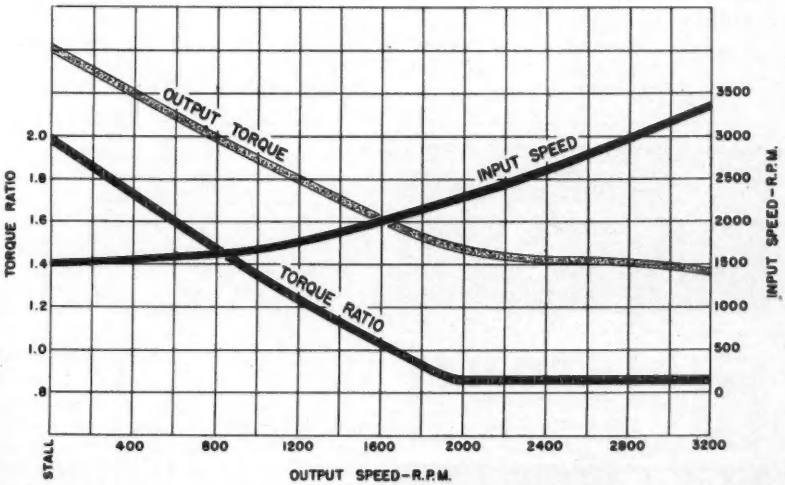
change gear mesh, but only clutch and band applications, and therefore can occur under full power, with no shift delay. Both ratios and direction of drive may be accomplished by driving or holding any of the three members of a single planetary train, but this would not obtain enough ratio changes for desired flexibility.

Therefore, two, or sometimes three planetary trains are coupled in series to obtain additional ratios. To save space in the Ford-omatic, the *two* planetary systems are "stacked" closely together by spanning both systems with "long" secondary planetary pinions. This eliminates the use of a separate internal gear for each system, as *all* the secondary pinions mesh with the *single* internal gear which transmits drive to the transmission output shaft.

The biggest advantage of combining the two systems is that the resultant compounding produces three different *ratios* of drive and one *direction change* to obtain reverse.

The complete systems are designated as primary and secondary systems and include the *clutches* necessary to introduce drive into each system. Both clutches are located for-

(*Continued on page 60*)



• ***Graph indicates torque multiplying characteristics at many different speeds.***

BOLT-ON EQUIPMENT

(*Continued from page 13*)

• Mercury test car gets GO signal from starter at the Santa Ana strip.

terially. It is also true that had each of these pieces of equipment been tested separately without the addition of others, particularly in the case of the dual exhausts, the increase for each item would have been much more noticeable due to the fact that each takes effect at a different speed range.

One more conclusion can be drawn. That is that minor souping procedures that can be done at home by the average motorist can add materially to the safety of the car. It was noted earlier that the greatest increase in useful power takes place at or near the speed limits of between 55 and 65 set by most states. Thus the power is found at precisely that point at which the average flathead engine begins to run out of horses.

Again, as noted earlier, this is the speed range at which most highway accidents involving the passing of one vehicle by another occur. The ability of the speed equipment prepared engine to pull the car around another vehicle, in other words leaving the passing vehicle on the wrong side of the road, in the shortest time is evident.

The equipment used in this test can be purchased relatively inexpensively from any one of several reputable manufacturers and the results will be comparable although figures may vary slightly due to design differences. If these tests have proved anything, they have proved that bolt-on speed equipment, particularly for the flathead engine, CAN give readily noticeable results for the least amount of money. From this point on, all changes to the engine will be internal and will require more specialized tools than will be found in the average motorist's tool box, although there is no denying that these internal changes can vastly increase the power of the engine.

Take it from there.

LETTERS

(Continued from page 7)

and the Porsche. The fact remains that both of these cars were designed by the same man, Dr. Ferdinand Porsche. Most modern independent rear-ends are of the DeDion or fully articulated type. The main advantage of the swing axle is reduction of unsprung weight and better road "bite" during rapid acceleration. Its use with a stocker is of problematical value.—Ed.

STARTING YOUNG

Dear Sir:

I have enjoyed every HONK you ever put out, it's the best! I especially enjoyed the article on "The Way To Paradise" in the November '53 issue, by Dick Day.

However, I am only 14 years old, but save all the issues for future reference.

P.S. I like the new name CAR CRAFT.

Thanks for a great magazine.

Ray Grish

Altadena, Calif.

SHOPPING AROUND

(Continued from page 9)

the box. A finned and buffed aluminum cover tops it off, matching your other finned engine goodies. Price of the box is $6.95. Dealer inquiries are invited by the Boyce-Smith Company, 11823 Sherman Way, North Hollywood, Calif.

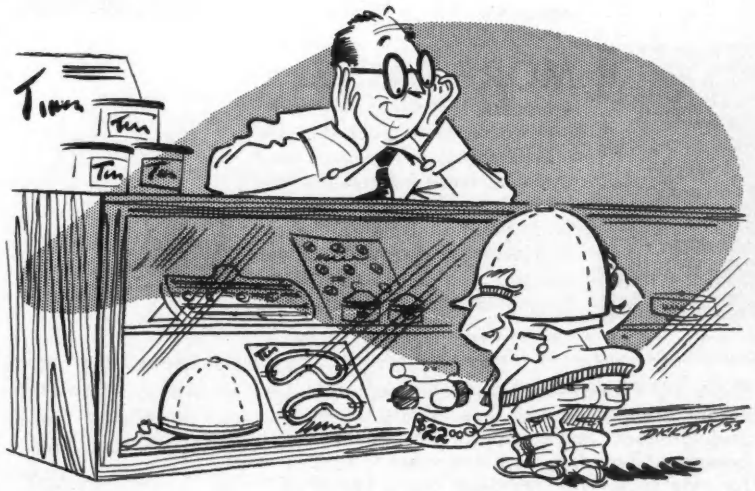
ROAD SANDER

ABOUT this time of the year a good percentage of our readers are undoubtedly running into snow and ice. Being provident folks they probably are lugging bags of sand, ashes or gravel in the luggage compartments of their cars. This is a practice that can louse up any trunk. Far better is a new dash controlled sander that, with a mere push of a button, automatically sands the road for you without the necessity of getting out into the cold. Essentially, the sander consists of a six-quart tank mounted in the trunk. Two aluminum tubes with rubber spouts lead to the

(Continued on page 61)

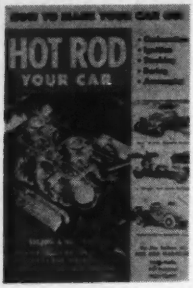
LIL' BEEP

By Dick Day



"Yuh sure this is the smallest size ya got?"

Check the List for Car-Minded Men



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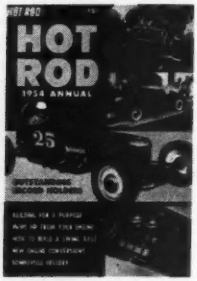

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when it comes to making use of the proven methods of obtaining top performance. This carefully compiled reference guide is made up of the best, most practical material in the field. 160 pages of succinct facts, over 225 photos plus diagrams, cutaway drawings, details of outstanding cars.

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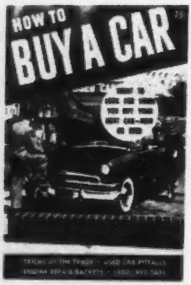

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on what to look for are needed by prospective buyers, whether the purchase is to be a new or used car. The more information you have about the dealer, the contract, your legal rights, the car and its proper care, the more you can save. Get the facts about car buying in this revealing book.

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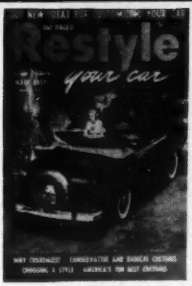

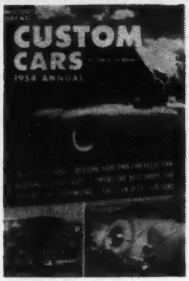

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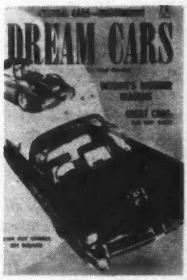

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FORDOMATIC

(continued from page 55)

ward of the planetaries. The primary system is driven by the front clutch, through a shaft to the primary sun gear. The secondary system is driven by the rear clutch, which is actually integral with the secondary sun gear. Around the rear clutch housing is wrapped the front band, which, when applied, will hold the secondary sun gear.

Thus, the secondary sun gear may be either driven (by the rear clutch) or held (by the front band). Another band, the rear band, is wrapped around the drum of the pinion carrier, located just behind the rear clutch drum. Thus, the rear band, when applied, holds the pinion carrier stationary, forcing the primary and secondary pinions to revolve on their pins as idler gears. As the pinion carrier mounts the pinions of both primary and secondary systems, and both sun gears nest coaxially inside, it accomplishes all the functions of two separate three-part trains, in one compact five-part train. The resulting relationships of the gears produce one train (the primary) of four gears, and one train (the secondary) of three gears. Because the final direction of drive in any gear train is determined by the number of gears in the train, we find that the four-gear primary system drives forward and the three-gear secondary system drives reverse. When the rear band is *not* holding the pinion carrier in intermediate, the carrier is free to rotate as the secondary pinions "walk" around the stationary secondary sun gear. This condition "splits" high and low ratios to produce intermediate, relatively closer to high than low.

Clutch and band applications may be easily summarized by a simple chart:

Gear	Clutch Driving	Band Holding	Ratio
High	Both Front & Rear	None	1:1
Int	Front Clutch	Front Band	1.48:1
Low	Front Clutch	Rear Band	2.44:1
N	None	None	None
R	Rear Clutch	Rear Band	2:1

First, notice that in high gear, both primary and secondary systems are driven. This locks up the complete system so that all the gear trains revolve as a single unit. Second, note that the three *forward* speeds all require the *front clutch*. When the *rear clutch* alone is driving, the secondary system drives in *reverse*. Third, the sole use of the front band is in intermediate. As all "drive" range starts are made in intermediate, the front band is made with a relatively soft lining material to smooth its application. Fourth, whenever the rear band holds the pinion carrier, in low and reverse, the greatest changes in ratio are produced; 2.44:1 and 2:1. As these conditions are apt to require extreme torque, the rear band is lined with a bronze composition and applied with pressures as high as two tons. In passing, we should also note that as far as "close ratios" are concerned, the Fordomatic has them closer than the standard transmission.

THE CONTROL SYSTEM

Upon viewing the maze of passages which constitute the hydraulic control system, the laymen is apt to volunteer the comment that the designer must have subsequently gone stark and raving. As a matter of fact, the system is not too complicated, and is very fascinating. First of all, it is designed to "think" in response to variations of three driving conditions. This causes the transmission to respond to variations in A: position of the manual selector (shift lever), B: road speed, C: throttle position. These variations in response are produced by: A: varying the control pressure which applies bands and clutches; B: by variations in governor pressure, which makes the transmission shift automatically from intermediate to high; and C: by varying throttle pressure, which allows the driver to control the speed at which the int.-high shift occurs. Consequently, though the transmission is fully automatic, a knowledge of these factors will allow the knowing driver to more fully control power to the rear wheels under all conditions. In the next installment, we will elaborate on some of the modifications to the control system which produce less slippage while shifting and generally contribute to more positive operation. The engine's relationship to the transmission will also be covered and how to modify engine performance to take advantage of converter characteristics. Though we do not encourage hit or miss tinkering, we do feel that a basic understanding of the function of the transmission linkage will enable the owner to recognize and avoid much of the grief associated with non-stock engine layouts.

SHOPPING AROUND

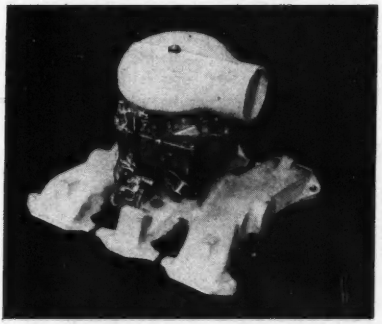
(Continued from page 57)

rear tires. A six or 12 volt motor in the base of the sander forces the grit out through the tubes to the precise spot where it is needed.

Prices are $34.95 for the six-volt model and $36.50 for the 12-volt model. Available from auto parts houses or from Hecker Products Corp., Albany, New York.

STUDE MANIFOLD

FOR Studebaker owners desiring to use the quad-jet carburetors, here's a new item just introduced by the Nicson Engineering Co., of Chev and GMC fame. In development



for almost a year, the manifold has produced a horsepower increase of 12 bhp at the rear wheels according to the manufacturer. The car used in the test was a '53 Studebaker Commander with a reading of 6,900 miles showing on the meter. Advantage of the quad-jet is smooth performance all through the speed range. For price and information, write Nicson Engineering Co., 4546 East Washington Blvd., Los Angeles 22, Calif.

(Continued on next page)

SHOPPING AROUND

(*Continued from preceding page*)

FIRE FIGHTER

HERE'S a gadget that should be in every car, and not just for putting out fires, either, although that's its main function. Anybody can have a fire under the hood or a blaze in upholstery and if you're stuck on the road without an extinguisher you might as well call the insurance company and have them tow away the total. This new carbon tetrachloride

extinguisher clips right to the firewall out of the way but easily reachable in case of an emergency. Another use is in thawing or drying out wiring these winter days. The extinguisher is easily refillable and can be pressurized at any filling station air hose. Made by Pyrene, the unit is available at auto parts stores and accessory houses all over the country.

CAR JEANS

IF you're tired of transferring grease from the seat of your pants to the seat of your car, you don't need to dirty up that old army blanket. You can give the carseat a set of coveralls with this new quick-change seat cover. The seat covers are washable and reversible. They'll even stand up under the abuse of one or more small boys all dripping ice cream, fruit juice or whatever else small boys are forever lugging into the family hack. Price of the covers is $3.98 each or $7.45 for a set of two. For further information write Shell Auto, 11726 Wilshire Blvd., Los Angeles 25, Calif.


MOTORAMA
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• *This was a special occasion; Gerry is ordinarily not allowed to drive on street.*

KID CUSTOM

by John Christy

• *Rear deck of small custom was made from top panel of '38 Ford. Bumper is Chevy.*

WE'RE going to stick our neck 'way out and make a prediction: 10-year-old Gerry Riggs is going to surprise a California driver's license inspector by the time she reaches sufficient age to come up before that gentleman.

She's got six years to go before that time and she already has a year of driving practice under her belt. The whole thing started before Christmas, 1952, when her uncle, Dick Lindley, a Los Angeles custom shop owner, decided that an automobile would make an ideal Yule gift for his favorite niece.

Lindley started with a basic box-type chassis made from three-inch angle iron into which went a 1½ bhp Continental lawn mower engine. The drive line is through a

(*Continued on next page*)

• Lawn mower engine is started in usual manner with a concealed pull cord.

belt to the left rear wheel with an idler pulley to tighten the belt for clutching. The same lever that engages and disengages the idler also operates the brake drum. When the clutch is disengaged the same motion engages the brake and vice versa. Ten-inch utility wheels such as those used on lawn mowers and industrial dollies complete the chassis.

The body was made from parts of standard sized automobiles that Lindley had around the shop. The grille bars came from a '51 Mercury, hood and nosepiece were fashioned from a center section of the hood of a '52 Ford. The front fenders were made from the peaked sections from a pair of '41 Oldsmobile fenders. The rear fenders were reshaped from '41 Ford units. Tying the whole thing together, creating an extremely rigid body unit, was some 60 feet of electrical conduit which was used for edging.

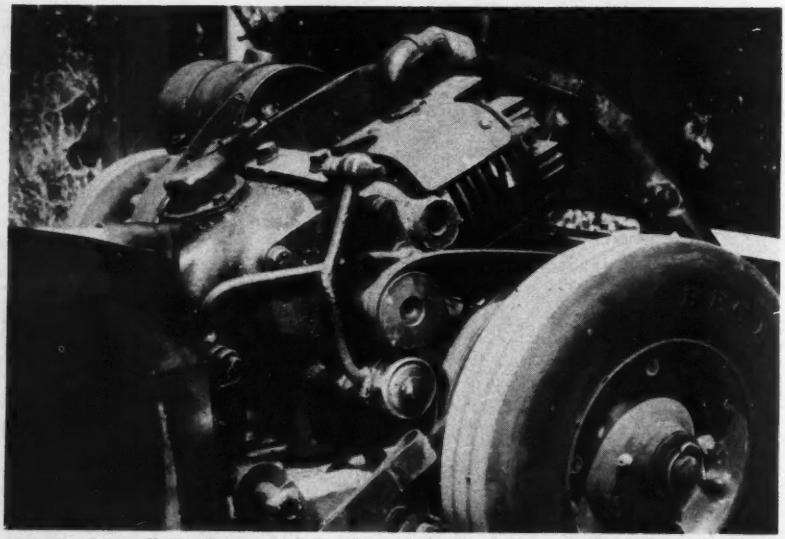
Headlights and taillights are all operational. The taillights were standard automotive accessories, being sold in kit form for turn indicators. Headlights are Lincoln backup lights.

As for the rest of the accessories and trim, the bumpers are from a '49 Chevy, trimmed to size. The steering wheel was hand formed and the windshield posts are standard speed boat accessories. Upholstery was done by Cicero Smith.

• ***He who rides with Gerry must work. Small neighbor cranks over the engine.***

If it weren't for the fact that the car is equipped with a governor, top speed would be in the neighborhood of 20 mph. However, the throttle is preset to give a top speed of eight miles an hour. Gerry is allowed to drive the car only under supervision or in the back yard to prevent run-ins with the law which might take exception to her lack of years without taking into account her ability.

Total cost of the car was $130 and three months' worth of spare time. However, Lindley admits he's gotten far more than $130 worth of enjoyment out of his niece's pleasure in the car.



• ***Engine is small 1½ horsepower Continental driving left rear wheel through a belt.***

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An unusual accessory—chrome finish, pleasant two tone signal. Easily installed under car floor by driver's seat. Fits all model cars. (Regular 5.95)..... **3.75**

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Sets include headers, header extension, mufflers, tail pipe, clamps and brackets

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CONTINENTAL KIT

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49-54 Ford
49-54 Chev

Kit includes sturdy tire mount, lock mechanism, tire cover, bumper extension, stone deflector, chrome hub cap and misc. hardware. Kits available for all cars.

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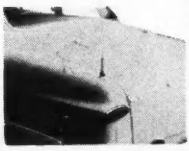

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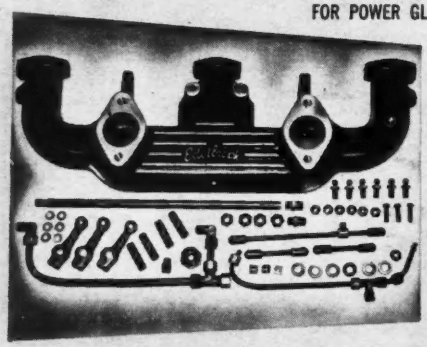

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